Distr.
GENERAL

UNCTAD/COM/15/Rev.1
21 December 1994

Original: ENGLISH, FRENCH
AND SPANISH ONLY

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

A SURVEY OF COMMODITY RISK MANAGEMENT INSTRUMENTS

Report by the UNCTAD secretariat

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FOREWORD

(i) Two trends have become apparent in commodity markets in recent years. First, there has been a move away from trading through intermediaries (such as trading houses) towards direct trade between producers and users of commodities themselves. The second trend has been the increased use that firms, mostly from the developed countries, have made of sophisticated market-based instruments (such as forward and future contracts, swaps and options) to protect themselves against the possibility of adverse price developments in the commodity markets of interest to them.

(ii) These developments in trading techniques offer commodity-exporting developing countries new opportunities to counter the fluctuations in the prices of their primary products. However, particularly because of the innovations continually being introduced in trading instruments, some officials in developing countries may not be acquainted with current modalities, nor with their advantages and disadvantages.

(iii) UNCTAD has been undertaking work in this area for a number of years[1] but such activities have recently gained new momentum. At UNCTAD VIII in February 1992, Governments recognized the importance of exploring new approaches to minimizing the risks arising from commodity market fluctuations and called upon the UNCTAD secretariat to address this issue.[2] In addition, Governments decided on that occasion that a group of experts should be established to make proposals to address the conditions for encouraging increased participation in commodity exchanges.[3] Subsequently, UNCTAD's Standing Committee on Commodities decided to analyze ways of improving the efficiency and use of existing mechanisms for the management of risks arising from commodity price fluctuations.[4] In addition, UNCTAD's technical co-operation activities are giving increased attention to training in commodity trading.

(iv) The purpose of the present report is to provide government officials and others in developing countries with general background information on the different commodity risk management markets around the world and on the variety of instruments that are used by traders in these markets to reduce their price risks. It is hoped that this information will contribute to a better understanding of the potential of both these markets and these instruments. In view of the large demand for the first issue of this report, published in March 1993, it was decided to issue a new, updated and slightly expanded version. The Commodities Division of the UNCTAD secretariat would welcome suggestions from readers for improving this text so that it meets this objective as fully as possible.

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[1] See, for example, "Commodity exchanges and their impact on the trade of developing countries", (TD/B/C.1/248), 18 May 1983.

[2] "Cartagena Commitment" (TD/364), paras. 205 and 213.

[3] *Ibid.*, para. 213.

[4] See TD/B/39(2)/4, annex I, para. B.4.

Chapter I

INTRODUCTION

1. The use of commodity-linked financial risk management instruments by commodity producers, traders and consumers, including processors, reflects the desire to obtain protection from uncertain adverse price movements and, in certain cases, to procure short-term finance. The higher and the more unpredictable the price volatility of a commodity, the greater is the possibility of incurring losses or realizing gains on future sales or purchases of a commodity. The greater the share in an enterprise's earnings or in its production costs that a specific internationally traded commodity or commodities represents, the greater that enterprise's exposure to price risks. The main users of commodity-linked risk management instruments for price hedging purposes are trading firms and marketing departments of large producing and consuming firms, including processors. It appears that direct trade deals between commodity producers and consumers have increased in importance for many commodities in the last few years and that the volume of trade handled by traders has decreased, as has the number of traders. Less reliance on traders has meant that producers and consumers have become more directly exposed to coping with price risks themselves. When world market prices for a commodity fall, a commodity producer risks being unable to cover production costs; a commodity trader who buys commodities before reselling them runs the risk of not covering his purchasing costs. On the other hand a commodity processor faces price risks both in respect of his inputs and outputs, as the extent of his processing margin is dependent upon variations in the two prices. Generally speaking, the risk for a final consumer is to pay higher than expected prices for the commodity that he purchases. There are also price risks associated with the holding of inventories by exporters, traders and importers.

2. Instruments for managing commodity price risks are varied and include stabilization programmes and funds (at the national or company level), marketing strategies involving the timing of sales and purchases, long-term contracts with fixed prices, forward contracts, the use of futures or options to hedge prices through commodity exchanges, and over-the-counter markets and the use of swaps and commodity-linked bonds.

3. Risk management is usually applied to only a portion of a company's production, trade or consumption. The size of this part depends on that company's risk exposure and hedging strategy. A key element in any hedging strategy is to determine the desired level in the trade-off between risk and return. Although most companies may claim their objective as "maximizing returns", there is the inherent contradiction that maximizing returns implies accepting maximum risks. The costs involved in a hedging strategy can also be considerable due to the high leverage incorporated in the financial instruments discussed in this report.[5] The part of production, trade or consumption which is hedged mainly depends on the level of income flow an enterprise wants

[5] Usually only an amount of between 5 and 10 per cent of the value of the instrument has to be deposited when it is purchased. Thus, a user's expenditures linked to the forced liquidation of a futures position caused by his inability to meet a margin call (the extra deposits required when the price moves against him) may be many times higher than the amount of the margin call.

to ensure. In addition, the size of this part depends on whether or not the available means of assessing the level of risk at any time (fundamentals of supply and demand, technical analysis and "psychological" factors) are perceived to be reliable, the relationship with and status of the enterprise's trading partners, and a number of other particular conditions (e.g. the marketing structure for the underlying commodity, the acceptable price level, the cost of using risk management instruments and flexibility of production or consumption).

4. Financial risk management instruments are available as standardized or tailor-made contracts. Standardized contracts are usually traded on commodity exchanges, whereas tailor-made contracts are traded over the counter directly between two market participants. Commodity exchanges are market places (exchange floors in cities like Chicago, Kuala Lumpur, London, New York, São Paulo or Tokyo[6]) for the trading of commodity contracts: contracts which specify for a commodity a specific quality, a specific volume, and specific delivery times and procedures.[7] With the standardization of contracts, the negotiation of contract specifications becomes unnecessary. This makes buying and selling faster and cheaper, and tends to result in a higher volume of transactions. On the commodity exchanges, hedgers can normally quite easily find a counterpart for their proposed sale or purchase of a contract because of the presence of both other hedgers who wish to take an opposite position and of speculators. Speculators are market participants who are not covering the price risks linked to a physical transaction in a commodity, but who wish to make profits from their perceived correct anticipation of future price developments and for this are willing to take on a price risk.[8] Commodity exchange markets usually operate under specific government regulations designed to maintain their solvency and to ensure certain standards, and hence are subject to government supervisory authorities.

5. In the over-the-counter market, on the other hand, contract specifications are not standardized: they are the outcome of a direct negotiation between two market participants and are tailored to suit the specific requirements of these participants for a specified period of time. Risk management contracts on this market are created and offered by a range of commodity trading houses (including the trading arms of large petroleum companies) and financial institutions (brokerage companies and private banks). As over-the-counter contracts are traded directly between two parties, i.e. on a principal-to-principal basis, they cannot easily be traded or resold. Over-the-counter markets are currently not subject to any specific regulation, mainly because they are considered as directly related to physical trade and because participation is, to a large extent, limited to large companies and banks who do not need the same level of protection as small-scale participants on commodity exchanges.

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[6] Nowadays screen trading is becoming more important. In this form of trading, trading takes place via a computer screen instead of on an exchange floor.

[7] See annex table 2 for a listing of futures exchanges which have commodity contracts and annex table 3 for a description of the major contracts by commodity.

[8] An enterprise with an interest in the physical market frequently operates as both a hedger and a speculator. Also nowadays on many markets a significant part of speculative transactions comes from large investment funds which are diversifying their investment risks by entering many markets.

6. The choice between using forward, futures or options contracts on organized exchanges and over-the-counter contracts is a difficult one. Price formation in over-the-counter markets is by nature not transparent and depends on the availability of necessary information and bargaining strength. Moreover, use of the over-the-counter market involves a counterpart risk - will the counterpart fulfill his obligations? In contrast, on futures exchanges prices are published for the types of contracts traded and a clearing house guarantees the fulfillment of contracts. An important difference between over-the-counter and commodity exchanges is that the former provides contracts both for exchange-traded commodities (for example, coffee, cocoa, sugar, petroleum, aluminium and copper) and for other commodities (for example, wood, cobalt or coal). Product specifications, place of delivery, and the period of reference can be different in an over-the-counter contract from the standardized futures contract. Moreover, over-the-counter contracts can be cheaper, in terms of commission costs, than exchange-traded instruments.[9]

7. It should be pointed out that an enterprise directly operating for its own account on an organized futures and options market may incur considerable costs to arrange its operations. Several full-time professionals and sophisticated communications equipment are needed, as well as access to costly information services. In a large number of cases, enterprises use these markets through an intermediary. There are different types of intermediaries, such as trade houses, brokerage houses, commission houses, banks or hedging departments of other producers or consumers. For example, exports or imports can be hedged without paying any commission costs and without having to worry about margin payments by going into a deal with a trade house, which in many cases is represented on the futures exchanges, for a certain quantity of a commodity with the price linked to a futures price. The disadvantage in doing this is that the actions of the enterprise are fully known to the traders, who can profit from this knowledge. Nevertheless, this is probably the most common use made of risk management instruments by buyers and sellers of commodities. An enterprise can also use the services of brokers, commission houses or banks. This has the advantage of anonymity. Alternatively, an enterprise can use the facilities of other companies which are large enough to be themselves active on the futures exchanges.

8. The use of different instruments is not mutually exclusive. Which instruments are chosen and how they are combined depends on the user's hedging strategy. In addition to the elements to be taken into consideration in a hedging strategy mentioned above, any potential user has to decide whether the instruments be primarily used for price hedging, be part of a wider marketing strategy such as establishing or maintaining longer-term trading relationships, or be used for price hedging in combination with other financial deals, including raising investment funds. On the basis of these considerations, three types of market-based financial risk management instruments and their respective users may be distinguished (for details see annex table 1):

(a) forward contracts and over-the-counter options which are primarily trade-related instruments; as these contracts incorporate high credit risks, they are used only when trading partners have mutual confidence in each other. Forward contracts can also help in obtaining short-term export financing;

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[9] This is also the case if a number of risks need to be hedged: for instance, an over-the-counter contract covering a US-dollar-denominated price risk for the export of a commodity which is to be paid in French francs is likely to be cheaper than covering the commodity and the currency risk separately with exchange-traded contracts.

(b) futures and exchange-traded options, as well as swaps between banks and consumers, which are primarily price hedging instruments. Like forward contracts, futures contracts can be used to obtain short-term export financing;

(c) swaps between intermediaries and producers, and commodity-linked loans and bonds, which are instruments combining elements of price hedging with financial deals; swaps may be used to combine price hedging with securitizing of investment, while the primary aim of commodity-linked loans and bonds is to raise commodity-linked finance.

9. The trading of risk management contracts, particularly exchange-based futures and options, can play an important role in the price discovery mechanisms for the commodities involved. The prices of futures contracts over various contract months should provide a profile of expected future prices. When this is so, prices of futures contracts can be safely used in price negotiations for physical trade. However, there are several technical and regulatory conditions which need to be simultaneously met in order for futures prices to reflect adequately and over time the underlying supply and demand conditions for the physical commodity. It should be pointed out here that several futures contracts may not currently satisfy these conditions.

10. Commodity-linked contracts were the backbone of business on futures exchanges until the late 1970s. Since then, the importance of financial futures has continuously grown and these now account for three-fifths of the total transaction volume on futures exchanges. Among the commodity-linked futures and options contracts, trading in fuels is by far the largest, followed by aluminium, copper, gold and silver. The volume of contracts traded for agricultural commodities, particularly soft commodities such as coffee, cocoa, cotton and sugar, are much smaller in absolute terms and the number of contracts traded displays strong year-to-year variations.

11. Commodity-linked, market-based financial risk management instruments can be used to lock in prices and thus contribute to reducing the exposure of participants in commodity markets to price risks, and they can improve price transparency. They do not, however, change price trends or levels on commodity markets. This implies that these instruments are a means of raising the predictability of an enterprise's future commodity-linked cash flow rather than a means of stabilizing commodity prices as such. In fact, one of the conditions for a risk management instrument such as a commodity futures contract to be viable is the existence of significant uncertainty about future prices for the underlying commodity.

Chapter II

COMMODITY PRICE RISK MANAGEMENT - THE MARKET PLACES

12. The risk management instruments that are reviewed in this report are traded in two distinct types of markets: commodity exchanges and the over-the-counter market. To enhance understanding of the differences between these instruments and their uses, it is useful, before discussing the instruments themselves, to have an idea of the characteristics and functioning of these markets.

A. Commodity exchanges

13. A commodity exchange is a financial market where different groups of participants (hedgers and various types of speculators) trade commodity-linked contracts, with the underlying objective of transfering exposure to commodity-price risks. Organized commodity futures exchanges have existed since the last century; organized options trade was introduced in the early 1980s. The world's most important commodity exchanges are located in developed countries, and they bring important invisible foreign exchange earnings to these countries. These are the large exchanges of the United States (Chicago Board of Trade (CBOT), New York Mercantile Exchange (NYMEX), Coffee Sugar and Cocoa Exchange (CSCE) and New York Commodity Exchange (NYCE)), the three United Kingdom exchanges (London Metal Exchange (LME), International Petroleum Exchange (IPE) and London Commodity Exchange (LCE)), and MATIF (Paris), as well as those in Japan (see annex table 2). The United States and United Kingdom markets provide the international benchmark prices for the commodities for which they offer contracts.

14. A number of developing countries have their own commodity futures exchanges. In Singapore, the Singapore International Monetary Exchange (SIMEX) has contracts in different fuels, which are traded quite extensively, and gold; and the Singapore Commodity Exchange (formerly Rubber Association of Singapore Commodity Exchange, RASCE) trades various rubber futures, while it is planning to introduce futures on other soft commodities such as robusta. For non-fuel commodities, the Kuala Lumpur Commodity Exchange (KLCE) has the greatest international significance. It trades mainly in palm oil, although it also has contracts in crude palm kernel oil, cocoa and tin. Foreign participation accounts for a large part of its turnover. Another main exchange is Brazil's Bolsa de Mercadorias & Futuros (BM&F), where, since May 1991, United-States-dollar denominated coffee, live cattle, gold and soyabean contracts are traded. In the Philippines, the Manila International Futures Exchange, which trades red beans, soyabeans, copra, sugar, coffee and dry cocoon, all in the freely convertible local currency, attracts a large participation from other countries in the region. Argentina's Grain Exchange is one of the oldest in the world, with grain futures trade starting in 1907. A second exchange, trading in livestock futures and options, both in United-States-dollars and in local currency, was started in 1992. In China, a large number of commodity futures exchanges have been created in recent years (see Box I), while in India, the long-established futures exchanges may be poised for a comeback on the international scene (see Box II). Several countries in transition also have domestically oriented commodity futures exchanges (several CIS republics; Hungaria; Romania).[10] Many other countries, including Chile, Indonesia, Republic of Korea, Mexico, Nigeria, Poland and Thailand, are considering the establishment of their own commodity exchanges.

15. Trading on a commodity exchange can take place in various ways. Open outcry is the most common. The other ways are the balancing method, often considered as a variation on open outcry; electronic trading, or the use of a computer network; and the market-maker system.[11]

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[10] See for example Michel L. Debatisse, Isabelle Tsakok, Dina Umali, Stijn Claessens and Kutlu Somel, *Risk management in liberalizing economies: issues of access to food and agricultural futures and options markets*, The World Bank, Europe & Central Asia Regional Office; Middle East & North Africa Regional Office; Technical Department; Report No. 12220 ECA, 30 November 1993.

[11] In practice, the open outcry system and electronic trading can be linked, with electronic trading taking over after hours, when ring-trading is closed. Such a combination is planned, for instance, by NYMEX, to allow worldwide participation in its contracts.

Box I

The emergence of commodity exchanges in China*

With the liberalization of China's internal market, the need arose for marketing and price discovery mechanisms for commodities which previously had price controls. A growing part of production not only of farmers, but also of industrial companies were sold on the free market, on which processing companies were forced to obtain a gradually increasing part of their inputs. A central market place such as a forward or futures exchange was an obvious solution, and the Chinese Government started actively to study this possibility in 1988. According to the government's concept, exchanges were to go from wholesale markets to forward markets, with futures markets being the final stage. Actual developments may have bypassed expectations: the enthusiasm of Chinese companies for this new form of trade turned out to be strong.

The Zhengzhou Grain Wholesale market in Henan was the first to start operating, in October 1990. When it proved a success, five other provincial grain markets were opened during 1991, trading such commodities as wheat, maize, mung beans and sesame seeds. Despite China's poor physical infrastructure and lack of knowledge on futures trading, the number of exchanges increased exponentially, and in late 1993, there were 30 futures exchanges (most using electronic trading systems), while 50 wholesale markets were keen to offer futures trading possibilities. There were at least three futures markets in base metals (Shanghai, Shenzhen and Jinpeng); one in gold (Shenzhen); three in fuels and/or petrochemicals (Shanghai, Daqing and Nanjing; the latter exchange was cleared by the Hong Kong Futures Exchange); one rubber market, in Guangzhou; and seven cereals markets. There was also one "general" market trading agricultural products, metals, fibers and energy and chemical products, the Beijing Commodities Exchange, which was opened by the central government early 1993 with the purpose of "unifying" the markets existing throughout the country. The largest of these markets was the Shanghai Metals Exchange, which started trading futures in copper, aluminium, lead, zinc and crude steel in February 1993 (options were then and now not traded in China), and had become by late 1993 the world's third largest futures exchange in terms of contract turnover. The government decided already in 1993 that no more futures exchanges should be created, but with local governments competing vigourously over a slice of the futures pie, this central directive was not immediately effective. In late 1994, a more drastic decision was taken: more than half of China's exchanges was closed down or ordered to reverse to being wholesale markets, while only 15 restructured exchanges received formal government approval. Futures trade in a number of "strategic" products (steel, coal, gasoline, diesel oil, sugar and cotton) as well as in most financial contracts was banned.

Following the explosive growth of commodity futures markets throughout the country, the need for proper regulation made itself felt. During the early years of the 1990s, the central government virtually had lost control over these markets, which were being regulated by provincial or even municipal authorities. Two particular problems arose: a duplication of efforts to initiate new contracts, diluting the liquidity of any one exchange; and a problem with poorly regulated intermediaries, with the threat of the emergence of "bucket shops". The central government decided to regain control over the futures market by setting up a body for regulatory oversight, the Securities Regulatory Commission, in October 1992, by starting to draft a securities law which would also cover commodity futures (including the procedures for approval of new exchanges), and by adopting, in 1993, capital adequacy standards and an approval procedure for brokers.

The rationalization of the domestic structure of the futures industry (over half of brokerage companies, many of them subsidiaries of Hong Kong companies, were forced to close down after they failed to pass official muster), together with the learning process under which Chinese traders went as well as the appearance of an offshore market for the Chinese currency, seem to create the conditions necessary for an influx of foreign players. A considerable number of foreign companies have expressed interest. In particular, international banks, brokerages and metal companies have high hopes for the Shanghai Metals Exchange - American Express, Merrill Lynch and Samsung all requested chairs on the exchange in 1993, but were rebuffed. The Shanghai exchange trades mostly the same commodities as the London Metal Exchange. Arbitrage by Chinese companies between the Shanghai and the London exchanges is already strong. Consequently, prices tend to move in tandem. If the Shanghai exchange is to be opened to foreign participation, this would allow foreign companies to hedge much closer to the time of their actual physical transactions and to undertake arbitrage transactions. Two American exchanges, the Chicago Board of Trade and the Chicago Mercantile Exchange, have provided much of the initial support for the development of the Chinese futures exchanges, and hoped that these exchanges will ultimately be linked up the world economy through a globalized electronic trading system.

* See on China's futures markets for example the following articles: Richard Vivian, Futures and options world, *Metal futures start in China*, December 1992; Kathy Chen, "China is drafting a securities law: plan is lauded, but doubts are raised", *Wall Street Journal*, 15 March 1993; Neil Wilson, "Big Macs and base metals", *Futures and Options World*, April 1993; "China seeks to unify markets with comprehensive exchange" *Journal of Commerce*, 17 August 1993; "Shanghai Exchange seeks world status", *Metal Bulletin*, 27 September 1993; Neil Wilson, "The China Syndrom", *Futures and Options World*, October 1993; Jackie Horne, "China strings its pearls", *Futures and Options World*, February 1994; William D. Grossman, "China: emerging as a derivatives player, *Futures Industry*, Vol. 4 (1994), No.1; "Some restructured futures exchanges are backed by Chinese government", *The Wall Street Journal*, 24 October 1994.

BOX II

COMMODITY EXCHANGES IN INDIA*

Commodity futures markets have a long history in India. The first organized futures market, for various types of cotton, appeared in 1921, when the Cotton Exchange was created in Bombay. A second exchange, the Seeds Traders Association Ltd., also in Bombay, was created in 1926; this exchange traded oilseeds and their products such as castorseed, groundnuts and groundnut oil. A multitude of other exchanges followed, trading such commodities as raw jute, jute products, pepper, turmeric, potatoes, sugar, foodgrains and gold. Several exchanges traded the same commodities, and some of these had formal trading links. A complete regulatory framework for futures trade was drafted, including rules and conditions for trading in futures, a system for the licensing of brokers and a clearing house structure. Not only futures, but also options on a number of commodities were traded on the exchanges; for example, options on cotton were traded up to one year out, until all options were banned in 1939.

In the 1940s, forward and futures contracts as well as options were outlawed as part of the Government's drive to contain inflation, or trading in these contracts was made impossible through price controls. This situation remained until 1952, when the government passed the Forward Contracts (Regulation) Act, which up to this day controls all transferable forward contracts and futures. The Act again allowed futures market trade in a number of commodities (but excluded some which were seen as essential foods, such as sugar and foodgrains). It provided that forward and futures markets should normally be self-regulating, through the governing bodies of recognized associations, in which the government had the right to place several representatives. It was illegal to enter into futures contracts other than between, with or through the members of these recognized associations. The Forward Markets Commission (FMC) was created to supervise and regulate markets from the point of view of public interest, but in effect, gradually absorbed the exchanges' self-regulatory powers.

During the 1960s, the Indian government either banned or suspended futures trading in several commodities, including cotton, raw jute, edible oilseeds and their products. In the 1970s, futures trading in non-edible oilseeds like castorseed and linseed were forbidden. Even non-transferable forward contracts (contracts between two parties specifying delivery for a period further away than 11 days) were forbidden for a number of commodities. The reason for this crackdown on futures markets was that the Government considered that these markets helped to drive up prices for commodities, through giving free reign to speculators. In the same vein, restrictive measures directed at combatting speculation were put in place affecting the activities of the thirty-one "recognized associations" which were supposed to regulate trade in commodity futures. Among other things, speculators were called to pay extra margins when regulators deemed it necessary; and trade in contracts was simply stopped for prolonged periods (skipping one or more normal delivery months) when prices hit certain ceilings.

The Government's policies softened somewhat in the late 1970s, when futures trade in jaggery, a sugarcane product and as important as sugar on India's sweetener market, was allowed. Two government-appointed committees, in 1966 and 1979, recommended the revival of futures trading in a wide range of commodities, but little action resulted. In those commodities in which futures trade is allowed (pepper, turmeric, castorseed, potato and jaggery), turnover is relatively large, and a wide variety of groups (large farmers, domestic traders, exporters, brokers and speculators) are active. Contracts in most commodities are actively traded for periods up to 6 months out, and, as should be the case for mature futures markets, most contracts are used for hedging purposes, not for physical trade: a large majority of positions are closed out before maturity, and physical delivery is relatively rare.

The Indian economy is going through a process of liberalization and opening up towards the world market. Partly as a result, India's exporters are increasingly confronted with highly competitive world markets in which they are forced not only to work on slimmer margins, but also to sell further forward in order not to lose markets. The rupee has become fully convertible for commercial purposes. Against this background, the role of commodity futures market is being reconsidered by the government. Most of the contracts being traded in India are unique in the world. Although some are clearly oriented to the domestic market, others (such as raw jute, pepper and, a product proposed by the Bombay oilseeds exchange, rapeseed) have the potential to become of regional or even international importance. Several of the exchanges are interested in playing a more international role, and have requested the government, through the Forward Markets Commission, to assist them in this internationalization process.

* Main sources: Forward Markets Commission, *The forward contracts (regulation) Act, 1952 & Forward contracts (regulation) rules, 1954*, Bombay 1974; M. Pavaskar, *Saga of the Cotton Exchange*, The East India Cotton Association Ltd., Bombay 1985; India Pepper & Spice Trade Association, *Futures trading in pepper*, paper presented at the 16th Peppertech meeting, July 1991, Kochi; Forward Markets Commission, *Forward markets bulletin*, Vol. XXXIV, No. 3, Bombay, September 1992. The Bombay Oilseeds & Oils Exchange Ltd., *Towards revival of futures trading in oilseeds and oilseed products (edible oils, extractions and castor oil)*, Memorandum submitted to the Committee appointed by the Govt. of India under the Chairmanship of Prof. Kamal Nalyan Kabra, November 1993; and various papers presented at the UNCTAD Regional Workshop on Commodity Exchanges, Jakarta, May 1994. Madhoo Pavaskar, *Globalization of commodity exchanges - guidelines for action*, The East India Cotton Association Ltd., Bombay, August 1994.

16. In an open-outcry system, a number of people are assembled during a trading session on a market floor, in general standing in a so-called "ring" designated for the trading of a particular commodity. They indicate by hand signals and by calling out (hence the name "open outcry" system) the orders they would like to place and the price. A trading session can last anything between five minutes and a few hours; during this period, prices move rapidly, rarely remaining stable for more than a very short while.

17. Those present on the floor can be divided in broad terms between those trading on their own account (the "locals" or "floor traders"), and those trading on behalf of a producer, consumer, trade house, bank or broker (the "floor brokers"). Locals are a traditional part of exchange activity in the United States, but in the United Kingdom they are a relatively recent phenomenon: LCE only allowed locals in the mid-1980s, and on the LME they are still absent. Locals often contribute to a considerable extent to market liquidity: in markets as diverse as the New York Coffee, Sugar and Cocoa Exchange and the Kuala Lumpur Commodity Exchange, their share in the volume of trading is typically 30 to 40 per cent; on the CBOT, their share is estimated at 50 per cent. They rarely leave positions open overnight: they go in and out of trades during the same day. For locals, a personal presence in the trading ring, to take a view on what is happening and with personal contacts with other brokers and traders, is very important. There is therefore no real place for them in systems of trading other than the open outcry system.

18. The floor representatives of producers, consumers, trade houses, banks or brokers execute orders on behalf of their firms. A typical chain of events is as follows: a client (which can be an individual, a trading firm, another broker, etc.) gives a buy or sell order to a commodity broker; the commodity broker then calls his order station (if he is a member of the exchange; otherwise, he has to pass through another broker) where a telephone clerk records the order - indicating the exact time. The order ticket is handed to a "runner", who carries it to the firm's floor broker in the trading ring. The broker executes the transaction, if possible, and notes its execution on the order ticket. The runner returns the ticket to the phone clerk, who records the exact time the order has been executed and notifies the brokerage firm. The brokerage firm then notifies the customer, giving the exact price that has been obtained. The prices at which orders are executed are independently relayed to computer operators by exchange employees stationed in the trading ring; this allows instant, real-time reporting of exchange prices throughout the world.

19. Two elements of this process deserve special mention. First, the emphasis on the exact timing of all transactions. This is imperative for compliance reasons - when regulatory supervisors know the time of a transaction, they can easily check whether the broker has misused his information on a customer's order[12] and whether the order was executed at a correct price. Second, the degree of activity of the phone clerk may divulge information on the trading intentions of the firm from which others can profit. This puts floor brokers of firms which do not take any transactions from other firms at a disadvantage. For this reason many of the larger participants in international commodity trade are not members of any of the commodity exchanges

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[12] Brokers often not only execute trades on behalf of clients, but also trade on their own account, which is called "dual trading". This gives rise to a practice called "*frontrunning*", where brokers, once they get a customer order which they know will move the market, can decide to place their own orders before they place the orders on behalf of their client. The clients thus gets a somewhat less favourable price.

themselves, but act through brokers. In general, trade houses who have their own brokers on the floor spread out their orders over a large number of brokers not related to their firm in order to avoid too large a transparency regarding their intentions. Thus it may not be attractive for an exporter of a commodity to become a member of a commodity exchange if the exporter is only conducting his own business.

20. The balancing method is used by a number of Japanese exchanges (principally for raw silk, textile yarns, and rubber), and also in some spot markets such as the Kuala Lumpur Tin Market and the London over-the-counter spot market for gold. It is basically a system whereby offer and demand are matched by an auctioneer. The auctioneer asks sellers which quantity they want to sell at a given price, and then buyers how much they would like to buy for this price. The price is then changed until the moment that offer and demand are more or less in equilibrium; equilibrium is often reached within one to five minutes. All transactions take place for the resulting equilibrium price. Buyers and sellers can be assembled in a ring, or be in contact with an auctioneer by telephone.

21. In electronic trading, trades take place through a computer system. Parties authorized to use the system can put in the prices they offer or ask, and can decide to pick up orders from the system; a central computer matches bids and offers. Outside Japan, this system is little used for commodities; the exceptions are white sugar in London, rubber in Singapore and wool in New Zealand.[13] In Japan, electronic trading is used on a few exchanges: this is the case for all trade on the Agricultural Futures and Options Exchange (Kanex; this exchange is the result of a merger, in October 1993, of the Osaka Grain Exchange, Osaka Sugar Exchange and Kobe Grain Exchange) and the Tokyo Grain Exchange (the result of a merger, also in October 1993, between the Tokyo Sugar and Grain exchanges) and for the gold, silver, platinum and palladium contracts on the Tokyo Commodity Exchange. Compared to the open outcry system, electronic trading has two major advantages, and two major disadvantages. One advantage is that trade is not necessarily restricted to a limited time: 24-hour trading becomes possible. The other advantage is that those directly trading at the exchange no longer need to be physically present on the exchange floor: they can be anywhere in the world. These two advantages have given rise to GLOBEX, a 24-hour world-wide computer network for futures and options trade developed by CBOT, CME and Reuters (there are some other schemes being developed by competing exchanges).[14] An additional advantage of electronic trading is that transaction costs may be lower.

22. One major disadvantage of the electronic trading system is that there are few opportunities for locals. Locals, as discussed above, live to a large extent on their ability to interpret what they hear and see around them and on their relations with others in the trading ring. A computer-

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[13] For some time, the raw sugar contract on London Fox was traded on an electronic system. It was hoped that this would revive this contract, but the result was the opposite. The contract has now been transferred back to the exchange floor. London Fox has discontinued several other contracts traded on an electronic system (rice; base metal index; rubber) because of lack of liquidity. The New Zealand market is also at present hardly active. In Chicago, CBOT has introduced a scrap steel futures contract on an electronic trading system.

[14] For an overview of the different systems proposed by exchanges, see Portia Richardson, "The Twilight of the Gods", *Intermarket*, April 1989.

based system makes their involvement in trading less attractive.[15] As locals provide a large part of the intra-day liquidity on futures exchanges, their disappearance is likely to result in more problems in closing the deal one wishes and thus the necessity to accept less favourable prices. A second disadvantage is that with 24-hour trading, trading activity and liquidity are necessarily low at certain times of the day. This implies that manipulation of the market at those times becomes easier.

23. The fourth system for commodity exchange trade, the market-maker system, is most common in stock markets; it is also used by the Rubber Association of Singapore Commodity Exchange (RASCE). Market makers (seven large Singaporean and Japanese rubber trading firms) and clearing members (including a number of Japanese trading houses) are linked through a computerized trading network. Market makers are obliged to provide bids and ask quotes for a number of types of rubber for a number of contract months. The computerized system provides the market's best bids and offers, and a customer can pass his orders either directly through a market maker or through a clearing member. The market maker is obliged to trade with the customer for a price within the market's prevailing best bid/ask offer, even if his own quotations are different. Market makers can also trade among themselves.

24. Not everybody is allowed to trade on the exchanges. One can either become a member per se (the system at the LME, LCE and KLCE), or buy one or more seats and thus become a member (the system of most other exchanges).[16] If seats are sold, the number is always limited (e.g. 816 on NYMEX, 772 on COMEX, 527 on CSCE, 125 on IPE). Buying a seat can be expensive, easily between $US 80,000 and $US 200,000 on the large United States exchanges.[17] For every seat bought, one can put one representative on the trading floor. Larger companies often have more than one seat, and the number of people actually on the floor is generally much lower than the number of seats.

25. Considering an exchange's list of companies active on the floor is in general a better way to assess the width of its participation than considering its number of seats (this list excludes locals). On many exchanges, the number of floor trading firms is quite limited. To give some examples, there are 119 company members on the CSCE, 63 clearing members on NYMEX, 42 on the NYCE, 71 on the BM&F, 18 ring members on the LME, 51 floor members on IPE and 26 licensed traders on the LCE robusta coffee market, 38 on its cocoa market, and 15 on its white sugar market. The small number of companies trading on the floors of the LME and the LCE markets is somewhat remarkable, considering the influence of these markets for price formation worldwide.

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[15] Some hedgers also feel that "taking away the personal contact in the pit trading system would take away from ffective trading". Joe Spear, "Electronic trading slows pace of traditional pit; risk increases", *Feedstuffs*, 8 May 1989.

[16] In both of these cases, to become a member one has to be recommended, usually by two existing members. On most exchanges, one can either become a clearing or a non-clearing member, that is, become a member of the clearing house or not. Locals generally do not become clearing members. On some exchanges, clearing members have to buy several seats; e.g. on the Singapore Rubber Association Commodity Exchange, clearing members have to buy at least four seats.

[17] Some exchanges, e.g. the International Petroleum Exchange, make a distinction between seats for locals and other seats for which only companies are eligible.

26. The membership of several exchanges has changed considerably over the last few years. This is due to two developments. Firstly, the number of members has declined because of an erosion of commission fees, which has made it less costly to trade through another broker and thus less attractive to be an exchange member oneself. Secondly a change in the participants in commodity trade, from specialist traders to financial intermediaries, has led to a decline in the number of trade houses that are members of exchanges, while the number of brokerage firms and banks who are members has increased. For instance, on the LCE cocoa market the number of licensed traders declined from 45 in March 1988 to 38 in March 1992. While those giving up their membership were mainly cocoa traders, new members included the bank- and brokerage-related companies J. Aron & Co (Goldman Sachs), Credit Lyonnais, and PaineWebber. On the LME, the number of ring dealing members declined from 31 in 1980 to 18 in 1992. New members include the banking firms Barclays, Credit Lyonais and Mase Westpac and brokerage companies Refco and Shearson Lehman Brothers. Two other banks, Standard Chartered and Kleinworth Benson, applied for LME membership in place of their subsidiaries.[18] Banks have also started to play a role on other exchanges, e.g. Swiss Bank Corporation's recent entry onto NYMEX. These brokerage and banking companies have clearly become very important for commodity futures trade, not only as intermediaries for hedgers and speculators, but also for the offsetting of swap contracts. Several of the larger ones, such as Dean Witter, J.P. Morgan, Merrill Lynch, PaineWebber, Prudential Bache and Refco, are now represented on commodity futures exchanges worldwide.

27. Another development is taking place on the two fuel futures exchanges, IPE and NYMEX. During much of the 1980s, these were dominated by independent oil traders and the so-called "Wall Street refiners" (investment banks such as Morgan Stanley, Shearson Lehman, Goldman Sachs). The large oil companies at that time were still very much involved in long-term fixed price contracts. In recent years, the role of oil companies such as BP, Shell, Elf, Total, and Phibro Energy as intermediaries for third parties' trade has been increasing (viz. handling the trade of developing country importers and exporters). This is not entirely unproblematic: exporters may well be giving away a major part of their market power if they use an oil company instead of an independent broker as a risk management intermediary.

28. The balance of participants is different from market to market. Some markets, such as the London Metal Exchange, the IPE and the white sugar markets of London and Paris, are heavily dominated by commercial interests, who undertake both hedging and speculative trading. Others, for example most of the exchanges in the United States, Japan and all gold and silver markets, are dominated by non-commercial interests, many being speculators. Within the group of speculators, the role of locals vis-à-vis that of investment funds is different from market to market, and also from one period to another.

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[18] For banks this partly reflects that they are increasingly active as physical metal traders and partly their involvement in swaps. While before banks were only actively trading precious metals, in the early 1990s several, such as Barclays, Credit Lyonais, J.P. Morgan, Mase Westpac, National Westminster Bank and Rothschild and Son, moved into physical trade in base metals. However, it may well be that "the crux of the matter is that most legislation provides a more favourable regime for banks indulging in investment services than for commodities or securities brokers". ("Bullion, banks and the LME", *Metal Bulletin*, 26 November 1992).

29. Good data on market participation are largely absent, which is a major obstacle to any study on the influence of different market participants on the functioning of commodity exchanges. In the United Kingdom and France, there is no reporting on the importance of market participation by different groups.[19] In the United States, buyers and sellers of futures contracts on the commodity exchanges are divided for regulatory purposes between those who have an interest in the physical trade of the commodity concerned and those that do not. The first are called "commercial interests" or "hedgers", the second "non-commercial interests" or "speculators". While figures based on this classification are the only ones available, the nomenclature is misleading. While those users who have a commercial interest in the underlying commodity are often hedging their price risks, they also speculate on a fairly large scale. Those who do not have a commercial interest may be speculators or may be firms representing clients who are speculators or hedgers; or they may be market makers, arbitraging futures and options positions.[20]

30. In terms of transaction volume, figures on participation are difficult to obtain because many positions are opened and closed the same day. Table 1 shows the distribution of open interest (the remaining open positions at the end of the day) between "non-commercial" and "commercial" interests for a number of United States markets on 13 March 1992 (this distribution changes from day to day); non-reportable positions to a large degree refer to small scale speculators. As can be seen, non-commercial interests, together with those holding non-reportable positions, account for a significant share in all markets. Figures of the New York Cotton Exchange support the argument that these overall figures are misleading, as mentioned above. NYCE figures separate out "house" transactions from transactions on behalf of customers for both groups of large participants, those defined as "non-commercial" and those defined as "commercial". It is noticeable that for both groups, a large part of transactions is on behalf of customers. For example, for the cotton contract, 27 March 1992, speculators accounted for 36 per cent of total reportable positions; of these, one-third was on behalf of customers - who may be legitimate hedgers. Commercial interests accounted for 64 per cent, of which half was on behalf of customers - again, there is no way of saying whether these customers were, for instance, managed funds or those involved in executable orders.

31. Commodity exchanges all have a clearing house system: an associated clearing house automatically becomes a counterpart to all transactions on the exchange, and thus guarantees that there is no counterpart risk for those entering into transactions through the exchange. Clearing houses secure market safety by two means: by margining, and by providing financial guarantees. On the over-the-counter market, clearing houses do not exist, and thus all participants run counterpart risks. The continuous accumulation of counterpart risks in a growing market is one of the reasons why successful over-the-counter contracts are likely to give rise to new exchange-traded contracts.

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[19] Some exchanges report occasionally on their market participation, based on information which is given on a voluntary basis by their members. See, for instance, Alban Brindle, *IPE members' survey results*, IPE, 30 October 1992.

[20] CRT International, the largest market maker, is reported to account for up to one quarter of total turnover in some commodity futures markets, such as NYMEX.

Table 1: Distribution of open interest for a number of United States markets, 13 March 1992
(percentage of total short or long positions in a contract)

Contract	Non-commercial interests		Commercial interests		Non-reportable positions	
	long	short	long	short	long	short
CSCE						
Sugar No. 11	9.4	15.8	67.1	62.7	23.2	21.2
Sugar No. 14	-	-	70.6	74.8	29.4	25.2
Coffee C	18.9	9.7	44.9	71.5	31.9	14.6
Cocoa	15.7	14.3	60.7	70.2	20.6	12.4
NYMEX						
Light sweet crude oil	3.0	4.4	69.2	67.0	23.3	24.2
COMEX						
Copper	17.0	4.7	45.1	68.5	36.8	25.7
Silver	28.1	6.9	31.5	75.7	35.6	12.6
Gold	10.3	23.1	54.8	42.6	25.6	25.0
NYCE						
Cotton No.2	7.8	23.5	59.0	42.1	29.6	30.9
FCOJ	7.7	16.8	66.1	49.0	21.4	29.5

Only larger transactions are reportable. Non-commercial interests refer to the larger transactions/positions by investment houses, brokerages etc. who are members of the exchange. Commercial interests refer to the positions of those registered as having a physical interest in the underlying commodity.
Source: Commodity Futures Trading Commission, *Commitments of Traders in Futures*, 13 March 1992

B. The over-the-counter market

32. The medium of trade for over-the-counter risk management instruments such as forward contracts, swaps and over-the-counter options is the over-the-counter market - a concept that includes many different forms of interaction.

33. In its simplest form, the over-the-counter market consists of a direct interaction between client and "intermediary" (with the intermediary being either a bank, a trade house, or a brokerage firm). This type of system is common for instruments directly linked to physical trade transactions, and for most "specialized" instruments - either longer-term instruments or ones designed for commodities for which no recognised reference price exists. The intermediary offers a certain risk management instrument for a certain price, presumably tailor-made according to the needs of the client, and the client can either accept or refuse this. "Shopping around" to find the most competitive quote is in general quite difficult, because the market is not transparent, with intermediaries refusing to give price quotes to those they do not know well. Moreover, once one has entered into a transaction, it is difficult to reverse it.

34. A somewhat more advanced form can develop when instruments become more standardized, as is already the case for longer-term fuel swaps and to some extent for metal swaps. In this form, a brokerage collects the quotes of a number of banks, trade houses, etc., and is thus able to offer the most competitive quote to potential clients, sometimes by way of an electronic information service such as Reuters. The brokerage then assists in putting the deal together.

35. The most advanced form of an over-the-counter market is that of the Brent oil forward market, which in many ways resembles a futures market[21] - even to the extent that squeezes similar to those on futures exchanges are tried from time to time. Companies often sell cargoes for forward delivery to other companies at the market price of the moment and buy these cargoes back later. The purpose of these "paper" transactions is to manage price risks, as is the case of futures. For example, a company which wishes to cover itself against the risk of a price decline for a quantity of Brent oil it has in its pipeline can sell one or more cargoes on the forward market and buy back these cargoes when the physical transaction has taken place. If prices have declined, the company will have made a profit on the "paper" transaction which will offset at least partially its losses on the physical transaction. Thus a risk management market has come into being.[22] All these transactions take place by phone, with a confirmation by fax/telex; thus, participants must be known to each other. The participants are large oil firms (producers, traders or refineries) and investment banks. The Brent oil forward market is difficult to use for outside speculators because of its transaction size: the normal contract is for 600,000 barrels (compared to 1,000 barrels on the futures exchange), with a value of over US$10 million.

36. For all over-the-counter intruments, the market is "made" by intermediaries. They are the ones who decide which instruments will be available, and at what price. These intermediaries can be divided into real intermediaries, who take virtually no risks, and "financial engineers" who manage a portfolio of risks using a wide array of instruments and in general take on some residual risks themselves. In the first group there are a number of brokerages and banks; in the second group, trade houses and a limited number of large investment banks.

37. One essential characteristic aspect is that all the banks, trade houses and brokerages offering over-the-counter instruments are risk-averse. They try to limit or even eliminate the risks they take when offering risk-management instruments by offsetting transactions, either over-the-counter, on a futures exchange, or in physical trade. As the possibility to offset swaps and similar mechanisms by physical transactions improves an intermediary's capacity to offer different instruments, it has become attractive for investment banks to become involved in physical trade. Partly as a result of this, Salomons took over Phibro; Goldman Sachs took over J. Aron; and several banks such as Credit Lyonnais, Barclays and J.P. Morgan have set up their own commodity trading subsidiaries.

38. Another essential aspect is that all those putting together over-the-counter risk management deals make profits on their margins. When competition increases, margins decrease. These intermediaries thus have an interest in keeping instruments highly tailored to avoid

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[21] Similar markets exist for several fuel products: naphta, heating oil, gas oil, heavy fuel oil.

[22] See also P. Lemanski, *Le négoce international du pétrole*, Les Cahiers de Recherche du CREMMAP, Numéro 15, juin 1988.

standardization, an interest that is contrary to that of many of those using the instruments. The forces of supply and demand for over-the-counter risk management instruments thus work in opposite directions, with the likely result that there will be a continuous expansion in the types of instruments offered by the intermediaries. The offer of constantly more complicated instruments limited only by the ability to develop software programmes which can manage the consequent risk exposures will be used to counterbalance the just as incessant standardization of simpler instruments.

Chapter III

COMMODITY PRICE RISK MANAGEMENT INSTRUMENTS

A. Forward contracts

39. Forward contracts are agreements to purchase or sell a specified amount of a commodity on a fixed future date at a pre-determined price. Physical delivery is expected. If, at maturity (the future date that has been agreed to in the contract), the actual price (the spot price) is higher than the price in the forward contract, the buyer makes a profit, and the seller suffers a corresponding loss. If the spot price is lower, the reverse is the situation. Nevertheless, having a pre-determined price eliminates the risk of price changes for both the buyer and the seller.

40. There are a few organized forward markets, mainly in countries in transition and in China. The London Metal Exchange(LME) originated as a forward market and retained many features of such a market until the Financial Services Act in 1986. Among these features were the continued reliance upon principal-to-principal contracts between members of the Exchange. Yet, in its essentials, the Exchange shifted from forward to futures trading over a century earlier, in the sense that only a very small percentage of contracts were expected to result in physical deliveries on the Exchange.

41. Most forward trade is over-the-counter, with transactions made directly or through brokers and dealers by telephone, telex and fax. While many over-the-counter forward markets for commodities are not very liquid (i.e., not heavily traded), a few are.[23] Examples of these are the Brent forward market for crude oil and those for several fuel products.

42. While forward contracts are used by commercial enterprises to lock in the price of products to be delivered in the future, most often they are used to hedge the risk of holding a certain commodity or having the obligation to deliver it. This is called "forward cover" and involves the execution of a set of (offsetting) transactions simultaneously in the spot and the forward markets. For example, if a trader holds (or purchases in the spot market) a certain commodity, he can insure against adverse price movements by selling the same amount of that commodity in the forward market at the prevailing forward price. When the forward contract matures, the trader sells that commodity at the specified price, thereby avoiding the risk of a price decline in

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[23] Forward markets for major currencies are liquid and there is keen competition between institutions in making forward quotations for transactions up to a maturity of one year.

the intervening period. This enables him to fix the amount of revenue from the future sale of the commodity at the time that the forward contract is signed, therefore locking in the price - and his profit margin.[24]

43. There are two important features of the forward contract. First, no cash transfer occurs when the contract is signed. The seller of the commodity is obliged to deliver the commodity at maturity, but the buyer pays no money up front (except for transaction fees). Second, since a forward contract is an agreement between two parties whose own reputations are the sole guarantee that the contract will be honoured, there is an inherent credit or default risk: the counterpart of the forward transaction may fail either to deliver the commodity or to pay the agreed price at maturity.

44. Forward contracts are widely used for all commodities and in all regions. For instance, a large part of the world's cotton is traded through three to twelve month forward contracts. Ghana sells a large part of its cocoa forward, and a crucial part of a World Bank programme with the Côte d'Ivoire was that it sell two-thirds of its cocoa crop forward from 1992 onwards.[25] Colombia sells the main part of its coffee through one-year forward contracts with roasters. Rubber exporters from countries such as Malaysia and Indonesia now sell principally through forward contracts.

B. Futures contracts

45. Futures contracts are, in subtle ways, different from forward contracts. Like forward contracts, they are agreements to purchase or sell a given quantity of a commodity at a pre-determined price. But, unlike forward contracts, physical delivery in fulfillment of this agreement is not necessarily implied: the contract can be used to make or to take physical delivery,[26] but usually, it is offset on or before maturity (the closing date of the contract) by an equivalent reverse transaction. On organized commodity exchanges, where most futures contracts are traded, this involves the buying at different times of two identical contracts for the purchase and the sale of the commodity in question, each cancelling the other out. This is called the closing out of the position and is possible because all transactions are guaranteed through a central organism, the clearing house, which automatically assumes the position of the counterpart to both sides of the transaction. Thus, a producer who wishes to hedge has an obligation not vis-à-vis

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[24] Alternatively, in the case of commodities traded on organized forward exchanges, instead of making a physical delivery he can transfer or sell his contract to someone else before its maturity date.

[25] See General Cocoa Co., *Weekly Newsletter*, No. 2158, 19 June 1992.

[26] Delivery on an exchange-traded futures contracts is not made in most cases to a trader or consumer but to an exchange-approved warehouse. When a market participant still holds a position in a futures contract a short time (generally two weeks to one month) before the maturity (the closing date) of the contract, delivery procedures are started. From this day on until contract maturity, those holding short positions can offset their position by buying a futures contract on the exchange, or alternatively choose to deliver to one of the exchange warehouses. These deliveries are assigned to those holding long positions by pre-determined procedures. These longs can take delivery, or retender the contract, thus incurring some storage charges, and hope that they can either offset their contract before they are assigned another delivery, or obtain a more favourable delivery notification. There are also alternative mechanisms on most exchanges for using futures contracts to transfer ownership of physical commodities, the main one of which is called "against actuals" or alternatively "exchange of physicals for futures" (see Box III).

a consumer or a speculator, but vis-à-vis the clearing house. Likewise, consumers obtain a position vis-à-vis the clearing house.

46. Like forward contracts, futures contracts more or less lock in the price the hedger is going to receive or to pay, but this time the mechanism is indirect. To hedge, a producer planning a future physical sale would, at the time of planning, sell a futures contract. This is also called price fixing. When he actually sells his physical good, he receives the market price for that day. If this price is lower than the price in the futures contract, the loss on the physical market is compensated by the higher price on the futures contract. This happens because the futures contract that he had sold earlier should have declined in value (in harmony with the physical market) enabling him to buy (re-purchase) the contract at the lower price. On the other hand, if the price in the physical market is higher than in the futures contract, the gain on the physical market is offset by the loss on the repurchase of the futures contract (see Box III for an example). Because the mechanism is indirect, hedging is also less secure: there is no guarantee that the profit or loss on the futures contracts will fully offset the loss or profit on the physical transaction. This is the so-called basis risk: the risk that users of futures markets run because the specific physical commodity they wish to hedge does not have the same price development as that for the standardized futures contract. This may happen for a variety of reasons. For instance, the markets to which a company exports are not necessarily the same as those where futures markets are located. Exchange rate risks can result (which in some cases can be offset on the financial futures markets). Also, price developments on the customer market can be different from that on the futures exchange. The product specified in the futures contract may not be the same as the product exported, and have a different price development. Moreover, the relation between futures prices and spot market prices can be temporarily disturbed, for example by attempts to manipulate the market or by technical squeezes caused by a shortage of supply.

47. When a producer, trader, processor or consumer decides to hedge his risks by buying or selling a futures contract, he has to reckon with margin payments. There are initial margins, the deposits that have to be paid for the sale or purchase of every contract, and margin calls, deposits that have to be paid later if the price of the contract moves in a way adverse to the customer. These payments act as guarantees for the fulfillment of contract obligations. On organized futures exchanges, the size of margin payments is determined by the exchanges (although brokers and other intermediaries generally provide credit lines to their clients to pay margin calls up to a certain level), while on the over-the-counter market, the size of margin payments is determined in direct negotiation between the two parties involved.

48. Futures differ from over-the-counter traded forward contracts in four main ways:

(a) Contract terms (amounts, grades and delivery terms) are standardized;

(b) Transactions are almost always handled by organized exchanges through clearing house systems (the LME was an exception until 1986);

(c) Most futures contracts are "marked to market" every day, using the settlement price of the day. Hence, if the futures price moves adversely for a holder of a futures contract, that holder is obliged to pay into the clearing house a sum equal to the value of the adverse movement (a margin call). This prohibits users of the market from carrying large unrealised losses over a long period, and thus reduces the risk of default. In the case of profitable price movements, clearing members (including intermediaries such as

brokerages), but not necessarily their clients, receive the profits of the day's future trading;

(d) Futures contracts require depositing small amounts of "initial margin" money in the exchange as collateral. Through these arrangements, futures contracts significantly reduce the credit or default risk contained in forward transactions.

BOX III

AN EXAMPLE OF COMMODITY PRICE HEDGING

Assume a commodity producer, in January, knows that he will sell 150,000 lbs of arabica coffee in 6 months time. The price in January for a September futures contract (a contract that reaches its maturity, that is, stops trading in September) is 86 cts/lb, a price that is sufficiently satisfying to the producer. Thus he can more or less lock in this price by selling 4 "Coffee C" contracts (of 37,500 lb each) on the New York Coffee, Sugar and Cocoa Exchange. The price for the futures contract is the price for a standard quality, and the producer knows that for his coffee he normally gets this price.

Imagine that 6 months later, in July, prices have declined. The producer sells his coffee on the spot market in New York for 71 cts/lb. The price of the September contract has declined also, to 71 cts/lb. This means that the producer is able to buy 4 September contracts for 71 cts/lb, and use these to offset the 4 contracts he had sold, for which he had received 86 cts/lb. He thus makes a profit of 15 cts/lb on the futures market. The effective price he receives for his coffee is therefore 86 cts/lb: with his sale of four futures contracts in January he effectively 'fixed' the price of his coffee six months before the physical sale took place.

Had the producer been unable to find a client in New York, he could have delivered his coffee into an exchange-approved warehouse in New York, and thus offset his sale of four futures contracts through physical delivery; again, the effective price he would have received for his coffee is 86 cts/lb. This is only attractive if the coffee the producer has for sale does not command a premium on the physical market. But even if the producer knows that for his coffee he normally receives a premium in comparison to the standard quality, the commodity exchange can be used to fix his sales price, as long as the price for his coffee on the spot market and that of the futures contract move in tandem.

49. Futures contracts are available for all major currencies, major interest rates and a number of mineral and agricultural commodities. Annex table 2 provides an overview of the commodity futures and options contracts traded on exchanges. There is also an active over-the-counter trade in futures in a few centers for certain commodities which do not have exchange-traded contracts and in some cases an over-the-counter futures market has developed in response to regional time differences which make use of an organized exchange impractical.[27] Risk management

[27] A good example is the Tokyo Curb which allows traders in Japan and other South-East and East Asian countries to take position on non-ferrous metals during daylight hours when the LME is closed. See Naoki Nakayama, "Tokyo curb link brings daytime non-ferrous metals trading to Asia", *The Japan Economic Journal*, 4 November 1989.

instruments offered for some metals such as cobalt and the short-term fuel swaps market could well be considered as an over-the-counter futures markets. It should be pointed out that in the United States, over-the-counter futures are illegal.

50. Developed country companies still account for the bulk of commodity exchange futures activity, be it speculative or for hedging purposes. Use by developing countries and Eastern European countries of the exchanges directly or through intermediaries is rather limited, but would seem to be growing. A very small number of developing country companies and other institutions are members of developed country exchanges. On the London Metal Exchange, MEMACO (Zambia's copper marketing company), Chile Copper Ltd (Codelco) and Gecamines (Zaire) are Associate Trade Members; on Comex, the Banco National de Mexico, active in silver trade, is a member. Recently, Chinese State-owned company CIFCO, one of China's largest brokerage houses, has become member of several American exchanges. In most cases, brokers, banks and other intermediaries are used to undertake activities on the futures markets. Some companies have their representatives close to the exchanges to arrange their risk management business, albeit by way of brokers. For example, Brazil's and Mexico's oil companies, Ghana's Cocoa Marketing Board and Cuba's sugar export organisation have offices in London and/or New York responsible for futures and options transactions. This allows these institutions to follow quite advanced risk management strategies.

51. However, most developing country users are far away from the exchanges and rely heavily on intermediaries. In most cases, these intermediaries are trade houses. Direct use of exchanges through brokers is limited. For soft commodities, Latin-American and Caribbean producers are among the major developing country users, hedging, through brokerage houses, about a quarter of the cocoa, coffee and sugar exports of the region on the Cocoa, Coffee and Sugar Exchange in New York. Latin American exporters of cereals and soyabeans similarly hedge on the United States exchanges. For metals, Latin American exporters are the most active direct users of the futures exchanges. The region's copper producers and manufacturers of semi-finished copper products (the major public and private copper exporters of Chile, Peru, Mexico and Brazil) have regularly used the LME and Comex. African producers such as Zaire, Zambia (both for copper) and Zimbabwe (for nickel) also use the exchanges. Outside Latin America, the main developing country user of commodity exchanges is China, which, through a number of brokers, is very active on the cereals, sugar, metals and fuels markets.

52. On the fuels markets, the Mexican Ministry of Finance was a major participant in the oil futures and options markets from November 1990 onwards. Its aim was to protect budget revenues. It sold through a number of trade houses crude oil futures and call options[28] and bought put options on NYMEX, with the deals spread out over a number of months taking into account the large volumes involved. Net profits were high, but the Government did have to put up deposits of some $200 million, an amount out of reach for many other developing countries.[29] Brazil's Ministry of Finance also locked in fuel prices during this period, though the quantities involved were smaller. Other governments active in this manner included Ecuador and Honduras.

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[28] For details on options, see section C below.

[29] "Mexico Locks in Price Of $17 a Barrel on Oil", *Washington Post*, 27 March 1991; "Mexico hedged against oil price fall", *Financial Times*, 3 April 1991. Note that the state government of Texas, strongly dependent for its income on taxes on oil, also has an active oil price risk management strategy.

53. In some cases, futures markets can be used as a market of last resort for physical delivery, especially by non-integrated mineral producers. The LME aluminium contract was used as such, especially by the former Soviet Union; Cuba, in the early 1980s, also used the LME nickel contract to deliver most of its nickel.

1. Liquidity

54. Liquidity, that is a high volume of transactions and a large number of participants, is an essential condition for the proper functioning of organized futures exchanges. If the trade in a futures contract for a certain contract month (for instance, a March cocoa contract) is liquid, those wishing to buy or sell can trade easily at little cost - that is, the difference between the price paid for a contract and the price that would be received for selling it (the bid-ask spread) is minimal. If the trade in such a futures contract is not liquid, manipulation of prices is easier, transaction costs include a high bid-ask spread and, as there is little competition, prices offered may not reflect economic realities. Markets that are liquid, or "deep", can easily absorb large offers without prices being unduly affected; in a market that is not "deep", large-scale hedgers have to space their transactions carefully to prevent unnecessary losses. A market that is liquid can be used easily for hedging purposes; a non-liquid market should only be used when one has a very good knowledge of the market, can follow its development on a regular basis, and knows how to devise a strategy that takes the lack of liquidity into account.

55. Another advantage of a high degree of liquidity is that speculators do not make systematic profits at the cost of hedgers. Futures markets are sometimes compared with insurance markets; hedgers pay a risk premium (comparable to an insurance premium) to speculators in order to cover their risks. If this comparison were correct, it would mean that hedgers follow a sub-optimal strategy. In the long run, they would systematically lose out to speculators. However, it seems that on liquid markets, because of the large degree of competition for buying and selling contracts, there is no real risk premium in the long term. The costs involved are those directly connected to concluding and executing the financial transaction.

56. Lack of liquidity is more a problem for commodity futures contracts than for currency or interest rate futures contracts. Many commodity futures contracts are not very liquid, especially when their term is beyond six months.[30] This situation may make it necessary to adapt hedging strategies, for example, instead of buying a contract for 18 months forward, buying one for six months, selling it at the end and buying a new contract to cover a further six months, and repeating the operation at the end of this period. This is called the rolling-over of the contract (see Box IV). This strategy can be used to obtain synthetic long-term hedges, similar to swaps. The choice of the commodity exchange to be used should also depend on the degree of liquidity. For example, Thai sugar exporters prefer to take the New York international raw sugar market as the price reference for their white sugar exports, instead of using the white sugar markets in London or Paris which have lower turnover and are dominated by a small number of trade houses.

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[30] See Graciela Kaminsky and Manmohan S. Kumar, *Time Varying Risk Premia in Futures Markets*, International Monetary Fund Working Paper WP/90/116, December 1990. Several other US states and other government bodies, dependent on revenues on oil sales or large oil buyers, have also started to manage their price risks on futures and options markets.

BOX IV

Rolling-over contracts in a situation of contango or backwardation in commodity futures markets

In a perfect market, the prices of further-out futures contracts are higher than the prices of nearby contracts, to reflect interest and storage costs; if this is the case, the market is said to be in contango. In the commodity markets, many futures contracts show the opposite pattern: nearby prices are higher than further-out ones. This is called backwardation. Backwardation can be attributed to the convenience yield, the value of having a commodity at one's disposal. The fact that having a commodity at one's disposal has an extra value is often the effect of a poorly functioning market. Many markets are squeezed quite regularly, with a shortage of supply for nearby delivery, be it for technical reasons (such as temporary supply disruptions, or as a result of exchange regulation, as in the case of the New York raw sugar market, where sugar from Cuba, the world's largest raw sugar exporter, is not deliverable), or because of games played by some of the bigger market participants.

Futures contracts for crude oil, non-precious metals, livestock and raw sugar are most of the time in backwardation, others, such as cotton and grain contracts, show backwardation from time to time. Only a limited number of contracts - principally gold, silver, soyabeans, arabica coffee and cocoa - systematically show a contango. Whether a market is likely to be in backwardation or contango has major implications for those wishing to hedge further-out positions, and to some extent for commodity processors.

To understand this, consider the way longer-term hedging operates. To obtain a three-year hedge on copper, to cover the price risks of selling 250 MT/month, a company would have to sell 360 futures contracts (of 25 MT each) on the LME. Ideally, the contract months sold should correspond as closely as possible to the timing of physical transactions. In practice, however, the copper contract loses liquidity after one year out. It is thus likely that the company would have to roll over its contracts and cover its sales of the second and third year by selling 240 contracts for one year away, repurchasing these close to the time of maturity, and at that moment selling again 240 contracts for up to one year further away; at the end of the second year, it rolls over another time, in this case 120 contracts.

Consider a market which is neither in contango or backwardation, that is, the price of all futures contracts is the same. In this case, the company would have to pay the same price for its nearby contracts as it receives from selling the contracts which are one year out; rolling-over is free of cost (abstracting from commission costs). If the market is in contango, the company would have a profit: further-out futures prices are higher than nearby ones, and the company would thus receive more from selling one-year out contracts than it pays for nearby contracts (note that this profit is independent from the actual movement of prices). In this way, a number of sugar trade houses had very large roll-over profits on covering a long-term contract with the Philippines in the early 1980s (when the sugar market was still in contango). Developing country exporters of commodities such as cocoa and coffee could, at least in theory, also profit from the contango which reigns in their markets by selling far forward and then rolling over their contracts, but they do not seem to do so at present.

Now, consider the case of a market in backwardation. A company would then pay a higher price for the nearby contracts it buys than it receives for the further-out contracts it sells. It thus makes a loss every time it rolls over its contracts. What is worse, this loss is, in theory, unlimited, because it depends on the scarcity of the commodity on the spot market. In practice, regulatory authorities normally impose a backwardation limit, but this can still be very high. Markets which are in backwardation are thus difficult markets for hedging longer-term price exposure, at least for sellers of the commodities concerned. For buyers of futures contracts (consumers or users), backwardation offers additional profit opportunities, while maximum losses are limited by the maximum size of the contango.

In practice, producers of commodities such as crude oil, metals, and sugar can still hedge their longer-term price exposure if they have relatively advanced skills in trading on futures markets. The viability of the long-term hedge will hinge on the ability to roll contracts forward every time that the backwardation disappears or becomes relatively small. This is another reason why over-the-counter instruments may play a large role in hedging longer-term price risks in these commodities: an intermediary's offer of a hedge to a producer can then be matched by a hedge with a consumer, and backwardation risks are virtually eliminated.

57. Linked to the question of liquidity of organized futures markets is the question of speculation. Often speculation is seen as profiting on the back of producers and consumers, or manipulating prices to gain profits. However, on organized futures exchanges, manipulation is more often tried by large consumers, traders or producers than by non-commercial speculators. Also, as is discussed above, on liquid markets speculators do not make systematic long-term profits at the cost of hedgers. In fact, speculation by a large variety of participants who have differing views of market developments and price expectations may increase liquidity and reduce the likelihood of market manipulation, thus making the market more attractive to hedgers. To quote the president of the New York Cotton Exchange: "statistics show that when we went for increased speculative limits, our volume and open interest increased by one-third",[31] typical signs of increased activities by hedgers. However, when there is large-scale participation by institutional speculators, hedging becomes more complicated. Short-term price movements generally become more pronounced, as these institutions, using the same types of technicalanalysis and computer programmes, tend to go in or get out of markets simultaneously and tend to trade in the same direction. These movements can have serious short-term effects for the representativeness of the prices of contracts in terms of their relationship to market fundamentals.

2. Indirect use of futures contracts in physical trade

58. Sometimes futures contracts are used to facilitate physical trade directly through mechanisms such as exchange of futures for physicals or against actuals (see Box V). The use of futures (and options) markets can also be indirect, by way of the over-the-counter market, generally through sales or purchase contracts with international trade houses. Physical sales contracts often contain clauses guaranteeing floor prices, price increase sharing agreements and the like, which in effect are largely combinations of futures and options.[32] The prices in these types of contracts are expressed as a function of specified future price quotations, or reference prices, which means that the final price at which the commodity will eventually change hands is not known at the moment of the signing of the contract. This use of reference prices is usually based on prices of futures contracts when they exist. This technique often makes it easier to come to a sales or purchase agreement, as one has effectively separated the price and volume component - the volume is agreed but only the price formula is agreed, not the actual price. Different pricing formulas can be used, the main ones being spot prices with profit or loss sharing, average pricing, price calls, and executable orders. Price calls and executable orders are mainly used for trade in agricultural products, whereas a system of average prices is generally preferred on the fuels and the metal markets; profit or loss sharing clauses are used in both the agricultural and the metal markets.

59. In contracts based on spot prices with profit or loss sharing, the reference price is set at a predetermined specified level; above or below that level, the buyer and seller share in the profit or loss vis-à-vis the actual price receivable. A variation of such a contract is a spot price contract with a price guarantee clause: for example, an exporter can guarantee its client that if the world market price falls below the price at which a forward contract was signed, the client will pay the lower world market price.

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[31] *Journal of Commerce*, 15 May 1991.

[32] See J.P. Morgan & Co. Inc. (eds), *Commodity Linked Finance*, Euromoney Books, London 1992, in particular chapter 2.

BOX V

EXCHANGE OF FUTURES FOR PHYSICALS (EFPs)

On most commodity exchanges (the one notable exception is the London Metal Exchange) there is a mechanism for using futures contracts to make or take deliveries of physical commodities which does not involve exchange-approved warehouses or delivery locations. In this mechanism of Exchange of Futures for Physicals (EFPs; in agricultural markets, they are also called "Against Actuals", AAs) two parties agree to swap simultaneously both their physical and futures positions, or to establish opposite positions with each other in both the physical and the futures markets. For example, a trader has a hedged commitment to deliver sugar, while another trader has a hedged commitment to buy sugar. Instead of the first trader buying sugar from the second, with both traders separately cancelling out their futures positions, the traders can swap both their physical and futures positions. Both will then effectively have closed the deal at the price at which they made their initial futures transaction. Note that EFPs are also possible if the parties have opposite physical commitments but only one has a futures position: then, this position is simply transferred to the other party.

This mechanism ensures that traders do not lose the bid-ask spread on futures contracts, and run no risk that the price a trade is executed for is more disadvantageous than the price one expected to execute it for (slippage risk). EFPs also allow traders to go into or get out of futures positions when the futures markets are closed. Another advantage is relative security: until the moment that the EFP takes place, the buyer and seller are protected against counterpart risk. EFP's also reduce the likelihood of deliberate squeezes of the market because a delivery procedure not involving the physical commodity specified in the futures contract has been put into place.

In general, EFPs are used within a pre-established commercial relation - they are a standard form of trade between trade houses. However, as most exchanges are willing to help their clients who are interested in finding new customers, EFPs can also be used as a marketing tool.

The size of EFPs usually surpass that of other delivery possibilities. For instance, on NYMEX, over 650,000 contracts in 1991 resulted in delivery through an EFP (about 10 days of world crude oil production), compared to under 5,000 contracts which resulted in standard delivery. On the CSCE raw sugar market, EFPs, on a busy day, can add up to close to 1 per cent of annual world trade. EFPs on less standard commodities, such as coffee or cocoa, are of somewhat smaller importance, but still involve a larger volume than standard delivery.

60. In the case of average pricing, the price which is finally paid is the average level of a reference price (or several reference prices) during a specific period, usually one month and often the month before shipment. This pricing system is very common in the case of metals traded on commodity exchanges, using futures prices as reference prices. Copper was the first metal for which commodity exchange prices replaced prices set by transnational companies. In 1966, Zambia, followed by Chile and most other copper-producing developing countries, announced that instead of selling for fixed prices they would base their contract price on the monthly average of

the nearest contract month of the LME copper contract. The pricing of other exchange-traded metals followed the same pattern during the 1970s and, in the case of aluminium, the 1980s. Export prices for these metals are now in general the average of LME prices in the month before shipment, plus a fixed premium or minus a discount. This system is also common in fuel exports. Several variations are possible, such as giving the buyer, at the moment of the final determination of the price, a choice of reference price periods.

61. In price calls, the seller (or buyer) has the right to choose for a certain tonnage (for instance, a fixed part of the total contract, or a variable part of up to, say, 25 per cent) the settlement price of the previous day's exchange trading of a specified futures contract . He advises his counterpart of his decision before the market opens, to give him the opportunity to hedge. This system is used in several agricultural markets such as sugar.

62. In executable orders, the price is determined as a function of a published price, generally a price on one of the futures exchanges. For example, a sales contract for a certain volume of raw sugar is signed in December for delivery in June, with a price clause that determines that the price will be 0.5 cts/lb below the raw sugar price of the July futures contract on the New York Coffee, Sugar and Cocoa Exchange at a specific, still to be determined date. The buyer and/or (as is normal in the case of sugar) the seller have until late June to fix the price at which the contract will be executed (see Box VI).

63. Executable orders offer considerable flexibility to both buyers and sellers, which makes them one of today's most commonly used pricing formulas for exchange-traded agricultural commodities. For sellers, executable orders are attractive when they expect prices to increase because it gives them a sales contract without having to lock in prices; a sales contract is in most countries necessary to obtain access to government pre-export finance. They were first mainly used in contracts between traders and consumer companies. The use of these contracts by producers dates from the 1970s for sugar, and from the late 1980s for cocoa and coffee. Executable orders are also widely used by developing country exporters of wheat and soyabeans. It is, after average pricing, the main pricing system used in copper trade. Developing country companies often prefer this type of contract to direct use of futures markets because they avoid the payment of margin calls.

64. With contracts such as executable orders, trade houses can offset the risks in their books (that is, use sales contracts to balance purchasing contracts), take on the risks themselves, or cover their remaining risks on a futures exchange. Trade houses used to keep large speculative positions. In the late 1980s and early 1990s, this caused some very large losses and resulted in the disappearance of several large trade houses. Banks now require trade houses to lay off most of their risks on futures exchanges.[33]

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[33] See, for instance, David Blackwell, "Banks pull out of commodities", Financial Times, 20 November 1992 and Neil Behrmann, "Squeeze on bank financing forces many firms to abandon the commodity trading business", *Wall Street Journal*, 28 December 1992.

BOX VI

THE OPERATION OF AN EXECUTABLE ORDER

Imagine the following price development for sugar

Date	22/12	31/1	28/2	28/3	30/4	31/5
Price (cts/lb)	8.6	8.7	9.1	8.9	8.7	9.25

The seller's marketing director is under instruction to sell a certain volume of sugar in December for delivery in July, but to realize a higher price than that prevailing in December (8.6 cts). He can attain this objective by going into an executable order in December based on the July futures contract with the right to fix the price some time between January and June. He sees that in February the price of this contract has gone up to 9.1 cents. At that date, he phones the buyer to advise him of his decision to fix the price at the level. Therefore he sells his sugar for 9.1 cts/lb. To avoid his price risks, the buyer had bought July futures contracts on the day of signing the contract, 22 December, for a price of 8.6 cts/lb. At the date that the seller decides to fix his price (February), the buyer can sell these future contracts. He receives 9.1 cts/lb per contract and realizes a profit of 0.5 cts/lb on each futures contract. This fully compensates him for the higher price that he has to pay for the physical sugar.

In practice, the fixing of prices does not take place on a single day, but on a number of days during the period between the signing of the contract and shipment, each time for a part of the contract volume.

65. For the above reasons, the reliability of prices of futures contracts on commodity exchanges as predictors of physical prices is of key importance for the sale of physical commodities. If the reference price cannot be regarded as reliable, price determination becomes a major problem. Such a situation, which can result from low participation of producers, traders and consumers of a commodity in futures trade, has arisen in the rubber market where pricing used to be based on futures quotations. Due to a large increase in longer-term forward contracts between producers and consumers, the spot market for rubber is virtually disappearing, and turnover on futures markets has plunged. According to an official at the Kuala Lumpur Commodity Exchange, at least thirty per cent of production should be priced and hedged through futures exchanges to maintain an effective pricing mechanism; now, this volume is no longer reached.[34] The pricing of forward contracts has thus become increasingly difficult.

[34] *World Commodity Report*, 30 August 1990. The Kuala Lumpur rubber contract is now inactive.

C. Options

66. Options are risk management instruments that do not lock in prices, but protect those who buy them against unfavourable price movements while maintaining the possibility to profit from favourable ones. An option contract is the right (but not the obligation) to purchase or sell a certain commodity at a pre-arranged price (the strike price) on or before a specified date. For this contract, the buyer or seller of the option has to pay a price to his counterpart at the time of contracting, which is called the premium; if the option is not used, this is the maximum cost involved. If an option gives the right to buy at a pre-set price, it is termed a call option. This right to buy at a pre-set price is attractive for those who think that the market price will increase: it will enable them to buy at the lower price. It gives price protection to consumers and to processors and traders for the cost of the commodities they purchase. If an option gives the right to sell at a pre-set price, it is a put option. This protects the seller against a price decline. Options can give the right to buy or sell a certain amount of a physical commodity, or, more commonly, they can give the right to buy or sell a futures contract. This sounds like an unnecessary complication, but in effect it avoids the complicated delivery problems that characterize options on physicals. The date on (or before) which the buyer can chose to buy or sell the commodity or the futures contract is called the "maturity" or "expiration" of the option contract. For exchange-traded options, the date is usually similar to the maturity date of the underlying futures contracts, while on the over-the-counter market, a wide variety of maturities going up to five years can be found.

67. Options can perform almost the same hedging functions as futures or forward contracts. But compared to forward contracts and futures, options have three interesting characteristics:

(a) Instead of locking in a price, options contracts limit the size of the maximum loss; this is equal to the premium paid up front. However, they leave open the opportunity to take advantage of favourable price movements;

(b) The buyer of an option has to pay the premium at the time of purchasing the option. This often requires a significant amount of cash at the outset. However, there is no risk of unexpected margin calls, which, in the case of futures, can result in the cancelling of the contract if the hedger cannot raise the necessary cash within the specified period (normally 1-3 days). This has been an important reason for the increased use of options;

(c) Unless the operation is executed via an exchange, the buyer of an option faces a credit or default risk by the counterpart; the seller of an option does not. The seller has already encashed his premium; the buyer, when he wants to execute his option, is dependent on the seller meeting his commitment.

68. The introduction of options on exchanges is fairly recent and followed a fast expansion in the over-the-counter option market during the 1970s. The first exchange-traded commodity option contracts for sugar, since options had been banned in the 1930s, were introduced in 1982 on the New York Coffee, Sugar & Cocoa Exchange. Since then, they have grown rapidly in importance, accounting now for a major part of the business conducted on the exchanges. Commodity exchange option trade is now active for a number of commodities -but mainly for

short maturities,[35] with the number of transactions beyond one year remaining very small. Options on futures are traded actively for oil, gold, silver, coffee, cocoa, sugar, soyabeans, cotton, aluminium and copper. Over the counter, an active trade in options of up to three years is developing.[36]

69. Most of the option volume on agricultural commodity exchanges and in the trade in gold and silver is the result of speculative activity, for a large part by institutional investors. Trade houses are also active but mainly to lay off the option risks they have taken in their physical contracts. For base metals, most option trade is done by commercial interests, basically North-American, European and Japanese producers, not necessarily for hedging purposes (see Box VII). On the exchanges for fuels, most option activity is also from commercial interests, be it producers, trade houses or consumers. Some developing countries are active on the fuel option markets, basically to protect themselves against an increase in their fuel bill (e.g. Chile, Brazil) or against a decrease in their export earnings (Mexico). In one country, Mexico, the government has decided to set up an intermediary organization which allows its farmers and processors to buy agricultural options. However, overall, use of option markets by developing country participants is fairly limited, in particular as regards African companies and governments. One problem is poor access. This may improve somewhat now that, since late 1993, the PTA Bank is offering agricultural option contracts to exporters and importers in Southern and Eastern Africa; in Nigeria, the NEXIM bank is planning to do the same.

70. Option clauses are often an implicit, sometimes well-hidden part of physical deals. Several trade houses, particularly in the cases of coffee and cocoa, offer floor prices and shared participation in price increases in their contracts. Separately-traded options on physicals are highly specialised, and markets for such deals can only be found within commodity trading houses and investment banks running "swap" operations. Some commodity producers, including from developing countries, sell options to trade houses through specific contract clauses. In the sugar market, for instance, both the Dominican Republic and India have used the sale of call options to sell a large volume of sugar. Such option clauses are also used in the oil market.

D. Swaps

71. Swaps were developed as a long-term price risk management instrument available on the over-the-counter market. With swaps, producers can effectively fix, i.e. lock in, the prices they receive over the medium- to long-term, and consumers can fix the prices they have to pay. No delivery of commodities is involved: the mechanism of swaps is purely financial. In a swap agreement covering a specified volume of a commodity, two prices are involved. One of these prices is variable and is usually expressed in relation to a published price index such as the price

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[35] Extremely liquid markets exist for options on currency forwards and currency futures. Recently banks have developed over-the-counter options moving out five years and in some cases up to 10 years into the future. See David Shirreff, "Swaps; where others fear to tread", *RISK*, Vol. 2, No. 8, September 1989. Interest rates also have very liquid option markets.

[36] See Neil Wilson, "New hedges for metals", *Futures and Options World*, December 1991; Sidney V Gold, "Cutting the risks of hedging", *Metal Bulletin Monthly*, March 1991. In the metals market, some traders are now prepared to provide a minimum price guarantee in the form of the sale of a put option to the producer for periods of up to five years (Jim Ainsworth, "Financing mining projects in the 1990s", *Metal Bulletin Monthly*, September 1991).

BOX VII

The changing face of option contracts

Traditionally, there were two types of options: European options for which settlement payments are made only if the index price exceeds the strike price at maturity; that is, the option can only be exercised on the expiration date; and American options for which the settlement payment is based on a specific time chosen by the buyer, that is, the buyer decides when to exercise the option. The use of these options is not restricted to the regions they are named after. However, neither of these structures of settlement payments is well suited for hedging an ongoing risk such as the regular export of a commodity, or for hedging contracts such as those common in the metal industry, in which prices are defined as the monthly average of daily LME prices. Moreover, they can be very expensive, especially in the case of American options. They are, as a result, mostly attractive to speculators.

Other types of options have flourished on the over-the-counter market. To tap the largely unexploited market of producers and consumers, a private bank, Bankers Trust, recently developed a new type of option, called the Asian or average price option. A settlement payment is made if the average of the index price over the life of the option exceeds the strike price. This conforms to the hedging of a regular flow of products, and is not well suited for speculation. The costs are much lower than those of the traditional types of options: for example, a 3-year European put option for oil, at a strike price of $20/barrel, in early 1990 cost $2.5 per barrel; a 3-year Asian put option would cost only $1.5 per barrel. A March to December 1991 conventional put option for copper, at a strike of $2,300/MT, cost $146/MT; an Asian put option would cost $100/MT.

Asian options are growing increasingly popular for metals, and their introduction on futures exchanges seems not far away - the London Metal Exchange is now doing exploratory work on the introduction of Asian options on the Exchange.

of a futures contract. The other is fixed at the time of the swap agreement. For example, in the case of a producer entering into a swap agreement with a bank, the producer pays the bank an amount calculated using the variable price and receives an amount calculated using the fixed price. (In practice, only net amounts are paid, either by the producer to the bank if the referenceprice is higher than the fixed price, and by the bank to the producer if the reference price is lower than the fixed price.)[37] In the case of a swap with a consumer, the consumer pays an amount based on the fixed price; the bank pays an amount based on the variable price. It is possible to integrate an option clause in the contract to permit the producer to profit from price rises (a so-called "swaption"), but in the case of commodities this is often prohibitively expensive due to the cost of the option premium. Swaps are often attractive to lenders or investors, as they provide security for the cashflow of the company to whom they are lending finance, and thus the ability of the company to repay a loan or to pay a dividend is improved by providing a long-term custom-designed hedge.

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[37] See for more details, J.P. Morgan & Co. (eds), *op.cit.*, chapters 2 and 5.

72. Commodity risk management instruments with maturities greater than a year have for a long time been very difficult to acquire. With the increasingly global character of business operations, an increasing need for securitization of loans and investments (i.e. ensuring their repayment), deregulation of financial markets and the introduction of new techniques in the financial risk management markets (which led the way to innovations in the commodity field), commodity swaps started to increase in number during the second half of the 1980s. Initially, banks and a number of trading companies (generally with production and/or refining interests which allowed them to offset risks by commercial operations) were the only participants. These are still the main participants, but a number of swap brokers traditionally active on the financial swaps market are now entering the commodity field. Most of those active in promoting swaps act only as intermediaries, laying off their risks by offsetting swaps (the risks of a swap with a consumer being compensated by an identical, reverse swap with a producer) or futures transactions. Risks of swap contracts can be offset by rolling over exchange-traded futures to obtain longer-term hedges (that is, regularly selling almost expired futures contracts and buying new ones).[38] There are only a handful of banks and trade houses (Bankers Trust, BP, Elf, Shell, Phibro Energy, Metallgesellschaft and Marc Rich are the main ones) who are willing to take principal risks. Compared to a swap agreement directly between a consumer and producer, the use of an intermediary has the advantage that the intermediary carries all risks associated with performance of the swap. The producer and consumer still buy and sell the commodity in the open market, but the swap compensates the participants so that in effect they have each locked in a fixed price for the commodity.

73. As a commodity swap is a purely financial transaction, it has the advantage of allowing the producer and consumer to hedge their price exposure without directly affecting their commodity production, distribution or procurement activities. Thus the participants have a large extent of flexibility to alter their production or consumption patterns to adapt to changing market needs. However, indirectly, these activities are influenced because a company has to generate the cash flows necessary to meet eventual obligations of the swap agreement.[39]

74. The majority of commodity swaps last anything from one to seven years. Shorter-term swaps can be arranged when futures or forward markets do not exist to hedge the exposure (e.g. for products not traded on the exchanges). In some rare cases, swap deals are as long as 25 years.

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[38] Futures contracts have developed in a manner designed to respond to the needs of the over-the-counter market. As longer-term instruments such as swaps are becoming increasingly important, counterparty obligations are becoming more long-term, and the risks run by intermediaries are increasing as is the pressure to find ways to offset these risks. There is therefore growing pressure to trade longer-period futures on the exchanges. This has already resulted in longer-term contracts for certain metals and fuels. On the London Metal Exchange, zinc, copper and aluminium contracts were extended in June 1991 from 15 to 27 months (until 1987, contracts were for only 3 months. On the Chicago Mercantile Exchange and the New York Mercantile Exchange, crude oil futures contracts were extended to 36 months. Also in 1991, London Fox and the New York Coffee, Sugar and Cocoa Exchange extended their cocoa futures contracts from 18 to 24 months.

[39] Note that these productive activities cannot be fully flexible. For a producer, for instance, if reference prices are higher than the fixed price that was agreed in the swap arrangement, the producer will need to pay the intermediary. This will not be a problem when the producer has products to sell on the market, but it does make it rather risky to close a production facility at a time of low prices, because prices may rebound with the producer being unable to obtain the necessary cashflow in time to pay his swap obligations.

75. The commodity swap market is at present nothing like as large as the interest rate and currency swap market. It was estimated to have some US$ 40 billion outstanding in late 1991,[40] compared with close to US$ 2 trillion outstanding on interest rate and currency swaps. Until 1991, a little under 100 commodity swaps were being completed each year, but the number is reported to have increased considerably since. The overwhelming majority of these commodity swaps (approximately three-quarters of the market) have been related to petroleum, a product which is widely traded and which involves significant risk exposure for both producers and consumers. Petroleum-related swaps can be based on a wide range of pertroleum products. Deals have been done, for example, for jet kerosene and high sulphur fuel oils, as well as for different qualities and locations of crude petroleum. The petroleum swap market can now be considered as liquid (for crude oil even 5-7 years forward), with over a dozen intermediaries willing to give price offers.[41] Commodity swaps have also been negotiated for non-ferrous metals, such as copper, aluminium, zinc, lead, nickel, platinum, gold and silver, and for coal. There have been few swaps for agricultural commodities, the commodities involved being wheat, paper pulp, orange juice, and sugar. A wide range of other commodities have been and are being actively considered for commodity swaps, such as maize, coffee, cocoa, natural gas and chemicals.[42]

76. For some agricultural goods, the existence of liquid and well established futures markets limits the need for such swaps,[43] but there is also a major technical barrier to the rapid development of swaps for producers in such markets. This barrier lies in the fact that the prices to be used in swaps are difficult to determine when they are based on the prices of futures contracts that are in backwardation most of the time (see Box IV) and where the level of backwardation is highly volatile. Thus the potential interest of financial intermediaries and clients alike in using swaps is reduced. Swaps with consumers are much easier to offset by futures transactions than swaps with producers. When one covers a swap with a consumer by rolling over futures, backwardations provide profits, while contangos result in losses; in the case of a swap with a producer the opposite is the case. Contango costs are limited and can be easily calculated, as storage costs and interest rates are known. The maximum backwardation costs are unknown: in theory, they can be infinite, and in practice, they depend on the intervention of the exchange regulators. A daily backwardation cost of up to 1 per cent of the value of the underlying commodity is not unheard of. Accordingly, in markets where backwardation prevails, banks and other intermediaries prefer to offset swaps with producers with back-to-back swaps with consumers; so they first have to develop the consumer market before they have enough flexibility to expand the number of swaps with producers.

77. For other products, the demand for swaps is simply not sufficient. Also for some commodities, the absence of suitable price bases makes settlement procedures very difficult; if the price is not based on a very liquid commodity exchange market, one of the participants may

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[40] "A broader tool found for hedging", *Financial Times*, 3 April 1991.

[41] Simon Brady, "Swap your risks away", *Petroleum Economist*, June/July 1990; "Oil price jitters ? Try energy swaps", *Institutional Investor*, December 1990.

[42] New markets are already forming. See Neil Wilson, "New hedges for metals", *Futures and Options World*, December 1991.

[43] Positions on the futures market can be rolled over to create a "synthetic swap".

manipulate it. Nevertheless, a few commodity swaps are based on price quotations other than from liquid futures markets.

78. For producers, one of the main goals of a swap is to obtain easier and cheaper access to capital, be it investment or loan capital. The swap deal is then imbedded into a wider financing deal, without there being a formal link between the repayment of the loan or investment capital and commodity prices (such as there is in the case of commodity bonds and loans, discussed in section E below). The expected strong growth of commodity swaps involving producers will probably be closely linked to their use as a tool in project finance.

79. The development of the commodity swap market has been particularly strong on the developed country consumer side, with banks and oil companies selling fuel swaps to airline companies, and several metal consumers locking in their long-term prices. These swaps were usually offset with transactions on the futures exchanges and not with swaps with producers. Eastern European countries are now entering this market. Some fuel swaps have been entered into by producing developing countries (among others, Angola, Congo, Malaysia, Nigeria and Trinidad and Tobago). Although demand for metal swaps similar to the Mexicano de Cobre deal discussed below has come from several developing country mining companies, the number of actual deals in the metals sector seems very small. The first important swap deals with developing country producers and on which sufficient information is publically available have been a copper swap by a private Mexican company, and a fuel swap by the Algerian state oil company. For illustrative purposes, these two are described below. There is very little information available on other, subsequent swap arrangements.

80. A US$210 million financing package with a copper swap was developed in 1989 by the New York branch of Banque Paribas for Mexicana de Cobre (MDC) S.A. de CV, a copper mining subsidiary of Grupo Mexico. The loan was the first voluntary hard currency loan to a private Mexican company since the 1982 debt crisis. The syndicated loan, managed by Paribas, had a term of 38 months and a fixed interest rate of 3 percentage points above the three year LIBOR. The proceeds of the loan were used to refinance the debt assumed when MDC went public and was acquired by Grupo Mexico in November 1988. The 12 equal quarterly repayments of the loan started in December 1989 from a collateral account set up by Paribas. The finance in this collateral account was secured at an amount sufficient to repay the loan regardless of the level of copper prices over the three-year period through the swap operations as follows:

- A long-term contract was set up with a copper user SOGEM S.A., a Société Générale de Belgique subsidiary, who agreed to purchase 4,000 tonnes of copper cathodes each month for the period of the loan from MDC: this amount accounted for about one-third of MDC's copper cathode production. SOGEM promised to pay an amount based on the average price for copper on the London Metal Exchange into the collateral account.

- For the same portion of MDC's copper production, MDC agreed to pay Paribas from the collateral account an amount based on a floating copper price (based on daily prices for copper on the London Metal Exchange).

- Paribas agreed to pay into the collateral account an amount based on a predetermined fixed price for the 38 month term of the loan. Paribas' fixed payment amount under the swap matched the amount necessary for the periodic loan repayments.

- Paribas entered the copper futures market to sell copper futures in quantities corresponding to the swap. By means of a systematic quarterly programme of unwinding its futures hedges, Paribas was able to cover its risks due to the difference between the floating and fixed amounts received from payments it made into the collateral account.[44]

81. A different example is provided by Algeria's state-owned hydrocarbon concern, Sonatrach, which in order to fund part of its investment programme, entered into a loan agreement with a syndicate of international banks in November 1989. The loan, which is coordinated by Chase Manhattan, consisted of a US$100 million conventional floating rate loan (with a seven year maturity and a four year grace period) and an options-related swap. With this scheme, Algeria re-entered the medium term syndicated loan market at a significantly reduced cost. The loan was structured as follows:

- Sonatrach paid the investors LIBOR plus 1 per cent; and it sold four call options written on oil (with maturities of 6, 12, 18 and 24 months), at a strike price of US$25, to Chase Manhattan.

- Chase Manhattan sold a series of profit-sharing options to the investors, valid for seven years, which gives them a supplementary 0.5 per cent interest for every dollar that the reference price is above US$22; and it sold a series of options to the investors, valid for seven years, which gives them a supplementary 0.5 per cent interest for every dollar that the reference price is below US$16. (This range of US$16-22 held for the first year; in the following years it progressively widened to US$13-26).

82. It is estimated that the cost of the loan would have been 3 to 4 per cent above LIBOR without the scheme. Sonatrach itself could not provide the options that investors wanted, as it was impossible for it to pay higher interest rates when its oil earnings were lower, while investors found this essential to compensate them for the higher default risk. The solution was a swap of options between Sonatrach and Chase Manhattan, with Sonatrach selling options at a strike price that it found acceptable (at a level higher than that wished by the investors), and for a period of only two years. In return, Chase Manhattan provided the investors with the options they wanted. This scheme has been described as a model for future developments in commodity-linked finance.[45]

E. Commodity bonds and loans

83. Commodity bonds and loans are a complicated set of risk management instruments, consisting in effect of a whole range of different mechanisms (see Box VIII). The commodity swaps discussed above are often part of a deal that involves commodity-price-linked loans and bonds. These risk management instruments have, normally, as their main goal not only the management of the financial risks of the company or country that issues the bonds or receives the loans, but also the financial risks of the lender/investor. They are usually linked to investment projects or debt reschedulings, and are not meant as a means for managing price risk in

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[44] World Commodity Report, 3 August 1989; "Commodities blueprint for corporate finance", *Euromoney*, March 1991, "Commodities Price Swaps", *Institutional Investor*, November 1991, and Rajat Kohli, "Derivatives move into financing's fast lane", *Metal Bulletin Monthly*, September 1992.

[45] Leslie Lassiter, "Commodities blueprint for corporate finance", *Euromoney*, March 1991.

commodity trade. Thus, they can act as a vehicle to obtain access to capital at easier terms. Most commodity bonds issued so far have been linked to gold, silver and fuels; some are issued on aluminium, copper, nickel, and coffee and cocoa.[46] The use of such bonds expanded throughout the 1980s, and the approximate value of publicized issues as of 1991 totalled around US$4 billion.[47]

84. From a hedging standpoint, there are important differences as well as similarities between a commodity bond and a forward contract. The main difference is in their cash flows:

(a) The purchaser of a commodity bond pays the seller at the outset, while in a forward contract no such exchange occurs until the completion of the contract;

(b) Commodity bonds typically pay interim coupon payments, but forward contracts only pay on maturity;

(c) Forward contracts are primarily short-term agreements. Commodity bonds are designed as long-term instruments.

85. The primary motivation of a commodity producer for a commodity-linked bond is to raise investment capital while ensuring the investment's return is not affected by changes in the price of the commodity through to use of a single instrument. This has been a powerful motive especially in the gold industry. In recent years commodity-linked bonds have also been used to pay off debts. The aim is to ensure a positive correlation between all debt service obligations and commodity prices, which reduces the overall risk to the producer.

86. A possible major new area for commodity bonds is their use as part of debt rescheduling programmes. In 1990, as part of the Brady Plan, banks which agreed to accept lower principal or interest payments on their existing loans to Mexico and Venezuela received new 30-year bonds from the Governments of these countries carrying the right to receive supplementary payments tied to oil export prices. Early in 1991, the United States regulatory organism, the Commodity Futures Trading Commission (CFTC), authorized Uruguay to issue notes in the United States equivalent to commodity options which gives the holders the possibility of receiving payments based on favorable changes in the prices of beef, wool and rice (exports), and petroleum (imports), again as part of a plan to restructure foreign debt. Early 1992, the CFTC authorized Nigeria to issue and sell bonds linked to crude oil prices. The Costa Rican debt restructuring scheme uses contingency facilities that are also very close to commodity-linked finance.[48] The advantages are clear: the borrowing country's debt service obligations become higher when its export earnings are higher or import costs are lower. By making it easier for the country to pay,

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[46] See T. Priovolos, "Experiences with commodity-linked issues", in T. Priovolos and R.C. Duncan, *Commodity Risk Management and Finance*, Oxford University Press, 1991. Note also the existence of bonds linked to commodity price indices, e.g. as issued by Goldman Sachs (by way of its subsidiary J. Aron one of the world's main commodity traders) in 1991 (see *Wall Street Journal*, 20 May 1991).

[47] This is probably a large underestimate. For instance, the volume of oil-price-indexed bonds and loans that are placed privately or through semi-private placements is far higher than that placed through public offerings. See Intercapital Brokers Ltd., *The complete guide to oil price swaps*, London, December 1990.

[48] Leslie Lassiter, *op.cit.*

it makes default less likely. It could also result in lower interest rates being charged.[49]

87. Commodity-linked arrangements are becoming increasingly important, including for developing countries. Nevertheless, most deals have so far been done in developed countries: for instance, a major part of the expected gold production for the next two to three years in Australia, North America and South Africa is covered by gold loans,[50] and several Western oil companies have issued commodity-linked bonds.[51] The earliest cases involving developing countries were designed to obtain finance on domestic capital markets. In 1980, Semirara Coal Corporation, a Philippines-based coal-mining company, issued local $17 million coal-indexed convertible securities. Mexico's state-owned oil company, Pemex, used oil-price-linked bonds, denominated in pesos, as its main source of finance in the early 1980s. Both interest and principal payments on the bonds were tied to export prices for Mexican crude oil. This allowed Pemex considerable protection during times of low prices, be it at a high cost.[52] In the mid-1980s, a Zambian cotton grower expanded its operations with a loan whose interest rate was linked to the international prices of cotton.[53] In 1988, Brazil's state-owned mining company CVRD issued two to four year bonds, worth $US 268 million in local currency, tied to gold prices.[54] Recent examples include the underwriting of a small palm-oil-price-linked loan in Malaysia by Citibank, the financing of a copper investment in Papua New Guinea by Metallgesellschaft with copper-price linked-finance. Late 1992, Ghana's Ashanti Corp. received a US$ 140 million gold loan with a related gold hedging facility, to be used to finance a 3-year expansion plan.[55] In 1994, Zimbabwe's Cluff Resources received a large gold loan from the Eastern and Southern African Trade and Development Bank (PTA Bank). Countries in transition have also entered the game: in late September 1993 the Russian Ministry of Finance started selling gold-backed bonds, to obtain relatively cheap finance in the prevailing high-inflation environment.[56]

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[49] See Timothy Besley and Andrew Powell, *Commodity-Indexed Debt in International Lending*, World Bank Working Paper, March 1989.

[50] See, on gold loans: Jessica Jacks, *Giltier thoughts*, Papers, articles and speeches by RTZ staff, Number 7, RTZ, London 1991, and John Van Os, "Australia moves on from the gold loan", *Metal Bulletin Monthly*, September 1992.

[51] Musa Essayyad, "Using commodity-indexed financing to fund OPEC/Alaska's development projects", *OPEC review*, Winter 1992, Supplement.

[52] T. Priovolos, *op. cit.*

[53] Jack D. Glen, *How firms in developing countries manage risk*, International Finance Corporation Discussion Paper No. 17, The World Bank, Washington, June 1993.

[54] See *Financial Times*, 27 October 1988; and Leslie Lassiter, *op. cit.*

[55] See "Synthetic gold loan for Ghana's Ashanti Corp.", *Trade Finance*, December 1992.

[56] "Russian Finance - golden bonds", *The Economist*, October 23, 1993.

Box VIII

Commodity-price-linked loans and bonds

Commodity-price-linked bonds and loans in reality consist of a large number of non-standardized instruments with often complicated specifications. There are many ways to tie the repayment of a loan or bond to commodity prices.

Commodity-linked loans are loans which combine a conventional bank loan with a commodity swap. In effect, instead of reimbursing the loan with variable interest-rate payments, the loan is reimbursed with the value-equivalents (using a reference price) of fixed amounts of a commodity.

Commodity bonds are a financial security in which the yield to maturity is linked mainly to the price of the underlying commodity. Instead of a fixed interest rate and a fixed amount paid at maturity, the pay-off of a commodity bond is a stated quantity of a particular commodity. There are several possibilities:

- Only the value of the bond at maturity is linked to commodity prices, while interim interest payments are a fixed percentage of the nominal value of the bond. For example, a US$1,000 face value gold bond may be repaid at maturity with a sum equivalent to the value of 3.00 troy ounces of gold;
- Not only the value at maturity, but also the interim interest payments are denominated in units of a particular commodity;
- Bond holders can have the choice of receiving either the nominal face value or the designated commodity amount at maturity. These bonds are termed commodity convertibles or indexed bonds;
- Bond holders can receive the nominal face value and have the possibility of choosing whether to exercise an option to buy or sell a certain amount of the designated commodity at a pre-determined price at maturity or at any other pre-determined date during the life of the bond. These bonds are termed option bonds.

The first two types of commodity bonds are often issued for risk hedging by the company (or country) involved; the latter two types are used to lower the cost of interest rates, because investors will be willing to receive lower interest payments in exchange for the commodity option.

Annex

Table 1

Overview of commodity price risk management instruments

Instruments	Description	Characteristics	Use	Main Users
Forward	- an agreement to purchase or sell a specific commodity on a specified future date at a preset price - most transactions are over-the-counter (otc), some (mainly for metals, coffee and rubber) are made on forward exchanges - tailor-made contracts matching specific hedging needs are available for otc contracts	- no initial cash transfer; cash transfer only at maturity - high (two-sided) credit risk involved - an initial position cannot easily be closed before maturity unless the contract is exchange-traded - physical delivery of the commodity is expected - the maturity of available contracts is primarily up to one year	- contract made today for the delivery of a commodity in the future, i.e. locking-in a future price - obtaining "forward cover", i.e. simultaneously executing a set of reverse transactions in the spot and forward markets - part of marketing strategy regarding longer-term trade relationships	- market participants who want to establish or maintain longer-term trade relationships - trading partners with a well-established relationship and mutual confidence
Futures	- an agreement to purchase or sell a specific commodity on a specified future date at a preset price - transactions are made in formal exchanges through clearinghouses - contract terms are highly standardized, i.e. tailor-made contracts are not available	- initial cash transfer for margin payments - daily cash transfers may be required - minimal (two-sided) credit risk - an initial position can easily and quickly be closed or reversed - physical delivery of the commodity is not necessarily implied - the maturity of available contracts is mostly up to 18 months, sometimes 36 months	- like forward contracts; however, futures are designed to deal directly with the credit risk involved in locking-in prices and obtaining forward cover - hedging price risk - obtaining short-term finance	- market participants whose liquidity allows them to meet the daily variation margin requirements - price hedgers (producers, consumers, processors, traders) and speculators (locals or institutions, such as pension funds) - market participants who do not want to worry about their counterpart's creditworthiness
Options	- the right to purchase or sell a specific commodity on or before a specified date at a preset price - transactions are made over-the-counter (otc) or in formal exchanges - tailor-made contracts matching specific hedging needs are available for otc options	- initial cash transfer ("premium") from the buyer to the seller of an option, representing the cost of the option - the option-buyer faces the option-seller's credit risk unless the contract is exchange-traded	- the purchase of an option limits the size of the maximum loss while it does not eliminate the opportunity to take advantage of favorable price movements - the sale of options can be used to valorize inventories	option buyers: - presently mainly developed country producers, traders and consumers - market participants whose liquidity allows them to meet the (sometimes substantial) initial cash-payment requirement

Instruments	Description	Characteristics	Use	Main Users
Options (cont'd)		- commodity options are mostly exercisable into a futures contract on the commodity rather than the physical commodity itself- the maturity of exchange-traded contracts is primarily up to one year - sellers (but not buyers) of exchange-traded options are exposed to margin requirements.	exchange-traded: - hedging price risk - obtaining short-term finance over-the-counter: - part of marketing strategy regarding longer-term trade relationships	option sellers: - market participants with uncertain hedging needs - market participants whose production and delivery terms are flexible and who want to valorize their inventory
Swap	- agreement to exchange specified cash flows at specified intervals - a series of cash-settled forward contracts strung together - transactions are mostly made directly with a bank or large trading company - contracts are tailor-made, matching specific hedging needs	- initial cash transfer and variation margin payments may be required - (two-sided) credit risk involved - physical delivery is not expected; purely financial instrument - the maturity of contracts is 6 months to 15 years (mostly 1-4 years)	- locking-in future prices for a long period	- market participants executing price hedging associated with financial deals - consumers wishing to protect their long-term price competitiveness by locking-in their input costs
Commodity-linked loan	- agreement to link the repayment amount of principal and/or interest to the price of a specific commodity or to an index of commodity prices - combination of a bank loan with a commodity swap - transactions are made through brokers - contracts are tailor-made, matching specific hedging needs	- no initial cash transfer by the borrower - the lender faces the borrower's credit risk - physical delivery is not expected; purely financial instrument - long-term maturity of contracts	- mainly linked to investment projects or debt rescheduling (at a company or country level), often as a vehicle to get easier access to capital at better terms - hedging price risk and raising investment capital using a single instrument	- market participants who want to ensure a positive correlation between debt service requirements and commodity prices

Instruments	Description	Characteristics	Use	Main Users
Commodity bond	a) forward type: - agreement to link the repayment amount of principal (this corresponds to the combination of a conventional bond with a commodity forward contract) and/or coupon payments (this corresponds to a combination of a conventional bond with a commodity swap) to the price of a specific commodity or to an index of commodity prices b) option type: - the bonds holder owns the right to purchase or sell a specific commodity on or before a specified date at a preset price - combination of a conventional bond with a commodity option a) and b) - transactions are made through brokers - contracts are tailor-made, matching specific hedging needs	- no initial cash transfer by the bond issuer - the lender faces the borrower's credit risk - physical delivery is not expected; purely financial instrument - long-term maturity of contracts	- mainly linked to investment projects or debt rescheduling (at a country or company level), often as a vehicle to get easier access to capital at better terms - hedging price risk and raising investment capital using a single instrument	- market participants who want to ensure a positive correlation between debt service requirements and commodity prices - developing countries (e.g. Mexico, Uruguay and Venezuela) whose external debt has been restructured

Annex
Table 2

FUTURES EXCHANGES WHICH TRADE IN COMMODITY CONTRACTS

Exchange	Contract volume, Jan.-Dec. 1993	Commodities traded
	(# of contracts traded)	
Chicago Board of Trade	178,773,075	maize, oats, soyabeans, soyabean oil, soyabean meal, wheat, diammonium phosphate, gold, silver
Chicago Mercantile Exchange *	146,746,990	pork bellies, live cattle, feeder cattle, live hogs, lumber, Goldman Sachs Commodity Index
MATIF (Paris) *	72,263,961	white sugar, potatoes
New York Mercantile Exchange	55,412,436	sweet crude oil, heating oil, gasoline, propane, natural gas, platinum, palladium
Bolsa de Mercadorias y Financieros (Sao Paolo) *	52,213,672	gold, live cattle, coffee (arabica)
London Metal Exchange	35,289,932	primary aluminium, alluminium alloy, copper, nickel, zinc, lead, tin
Tokyo Commodity Exchange	21,557,795	cotton yarn, wool yarn, gold, platinum, palladium, silver, rubber
Sydney Futures Exchange *	21,481,096	wool
Commodity Exchange, Inc. (COMEX) (New York)	18,857,122	copper, gold, silver, platinum
SIMEX (Singapore) *	15,729,787	gold, high sulphur fuel oil, gas oil
International Petroleum Exchange (London)	13,769,987	Brent crude, gas oil, unleaded gasoline
Tokyo Grain Exchange	13,687,747	soyabeans, red beans, raw sugar, maize, white sugar
Coffee Sugar & Cocoa Exchange (New York)	11,304,823	coffee (arabica), raw sugar, cocoa, cheddar cheese, dry milk
Kansai Agricultural Commodities Exchange (Osaka)	6,299,702	soyabeans, red beans, raw sugar, white sugar
London Commodity Exchange	3,740,315	coffee (robusta), cocoa, raw sugar, white sugar, EEC wheat, EEC barley, pigs, potatoes, soyabean meal
New York Cotton Exchange	3,437,664	cotton, frozen concentrated orange juice
MidAmerica Commodity Exchange *	3,002,480	maize, oats, soyabeans, soyabean meal, wheat, rice, cattle, hogs, gold, platinum, silver
Kanmon Commodity Exchange	2,145,095	soyabeans, red beans, maize, white sugar
Maebashi Dried Cocoon Exchange	1,782,394	dried cocoon
Osaka Textile Exchange	1,753,624	cotton yarn, wool yarn

Exchange	Contract volume, Jan.-Dec. 1993	Commodities traded
	(# of contracts traded)	
Manila International Futures Exchange	1,749,650	dry cocoon, raw sugar, soyabeans, copra, coffee (robusta)
Winnipeg Commodity Exchange	1,516,044	canola, flaxseed, barley, oats, wheat, rye
Yokohama Raw Silk Exchange	1,512,132	raw silk
Nagoya Grain & Sugar Exchange	1,507,871	red beans, soyabeans, white sugar
Kansas City Board of Trade	1,381,478	wheat
Kobe Rubber Exchange	1,275,051	ribbed smoked sheet rubber
Toyahashi Dried Cocoon Exchange	1,066,374	dried cocoon
Nagoya Textile Exchange	920,076	cotton yarn, wool yarn
Minneapolis Grain Exchange	876,776	wheat, oats, shrimp
Kobe Raw Silk Exchange	687,723	raw silk
Kuala Lumpur Commodity Exchange	362,958	crude palm oil, crude palm kernel oil
Hokkaido Grain Exchange	288,835	red beans, soyabeans
Singapore Commodity Exchange	250,992 (Oct. 1992 - Sept. 1993)	ribbed smoked sheet rubber, technical specification rubber
MERFOX (Argentina)	12,554	livestock

* primarily trading financial futures (currencies, interest rates, stock indices, etcetera)
Due to a lack of 1993 data on transaction volumes, Chinese and Indian futures exchanges, as well as exchanges from the various countries in transition, have not been included in this table. Some of these exchanges are rather large. For example, the India Pepper and Spice Trade Association trades over one million pepper futures contracts a year, and the Shanghai Metals Exchange, trading several metals, also more than one million futures contracts.
Sources: Futures Industry Association, *International report - December 1993*, and *Volume of futures & options trading on US futures exchanges, 1968 through 1993*; *Futures and Options World: Directory & Review 1993*

Annex
Table 3
MAIN COMMODITY FUTURES AND OPTIONS CONTRACTS[a]

ALUMINIUM

London Metal Exchange				
Contract specifications	High Grade Primary Aluminium, 25 MT Approximate value of one contract, January 1994: US$ 29,315			
Contract periods traded	Contracts are traded until 36 months forward. Both futures and options are very liquid until 20 months forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	3,990,429	10,083,342	365,291	900,266
Relative size of turnover	Futures and options turnover in 1993 was equal to over 25 times world market trade, or almost 10 times world primary and secondary aluminium consumption.			
Standard delivery procedures	Delivery against this contract is possible in a number of European warehouses, and in Singapore, Japan and the United States, CIF.			
Delivered quantities	In 1991, 1,093,275 MT was delivered into LME warehouses, 362,675 MT was delivered out of LME warehouses.			
EFPs[b]	Not allowed under exchange regulations.			
Relative size of deliveries	In 1991, deliveries into LME warehouses were equal to 10 per cent of developed country aluminium production.			
Market participants	The participation of investment funds is small; trade houses and aluminium consuming companies predominate, in futures as well as in options. The London Metal Exchange is very much internationally oriented, with only 3-4 per cent of its turnover coming from the United Kingdom, 25-30 per cent from the rest of Europe, 20 per cent from the United States, 20 per cent from Japan, and 25-30 per cent from other countries (Australia and countries in Latin America, Asia and Africa).			
Use as price reference	This contract acts as the main reference price for the trade in aluminium, alumina and to some extent bauxite.			

COCOA

Coffee, Sugar & Cocoa Exchange (New York)				
Contract specifications	Cocoa beans, 10 MT Approximate value of one contract, January 1994: US$ 23,000			
Contract periods traded	Contracts of up to 24 months forward are traded.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	1,635,917	2,128,384	344,944	326,760
Relative size of turnover	Futures and options turnover in 1993 was approximately 26 times world trade; in 1993, it was over 20 times world market trade.			
Standard delivery procedures	This is a CIF contract, with delivery in United States ports (New York, Delaware or Hampton Roads). 'Any kind of cocoa bean', as long as it meets United States import standards, can be delivered against the contract; in most other futures contracts, the possible origins are specifically listed.			
Delivered quantities	4,751 contracts resulted in delivery in 1990.			
EFP's	Allowed, and more important in volume than physical deliveries.			
Relative size of deliveries	Physical deliveries in 1990 were equal to one month of United States cocoa consumption.			
Market participants	Market members include brokerage companies, traders, and chocolate manufacturers such as Hershey Foods or Nestlé. Non-commercial interests, including managed funds, account for a large part of market turnover.			
Use as price reference	This contract is used in world cocoa trade, mainly in relation to the North American market.			

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a/ Information reported when available.

b/ Exchange of Futures for Physicals, also called Against Actuals. These allow for a simultaneous exchange of physical commodities and futures contracts, and are much used by trade houses.

London Commodity Exchange				
Contract specifications	Cocoa beans, 10 MT Approximate value of one contract, January 1994: US$ 23,000			
Contract periods traded	Futures and options contracts are traded until 24 months forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	1,688,569	1,908,136	151,962	107,102
Relative size of turnover	Turnover in 1993 was approximately 25 times world market cocoa bean trade.			
Standard delivery procedures	This is a CIF contract, with delivery possible in several European ports.			
Delivered quantities	In the first ten months of 1992, 89,390 MT of cocoa was tendered into London Fox warehouses.			
EFP's	In the first ten months of 1992, EFP's for 769,510 MT took place, equal to close to half of world imports.			
Relative size of deliveries	Physical deliveries into London Fox warehouses during the first ten months of 1992 were equal to approximately one tenth of European cocoa imports. EFP's equaled			
Market participants	This contract is used for hedging purposes by a large number of international participants, who, however, are for the most part not present on the exchange themselves but use a London-based broker or trade house.			
Use as price reference	This is the main contract for internationally traded cocoa, and it gives the reference price for a large part of cocoa transactions, especially for the European market.			

COFFEE
ARABICA COFFEE

Coffee, Sugar & Cocoa Exchange (New York)				
Contract specifications	Coffee "C", 37,500 lbs Approximate value of one contract, March 1992: US$ 28,000			
Contract periods traded	Contracts of up to 18 months forward are traded. Both the futures and options contract are very liquid one year forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1991
	1,774,050	2,489,223	114,216	1,022,017
Relative size of turnover	In 1993 futures and options turnover equaled approximately 10 times world arabica coffee exports.			
Standard delivery procedures	Delivery is CIF, in New York, New Orleans or San Francisco.			
Delivered quantities	In 1990, about 1 per cent of contracts resulted in delivery, or a total of 3.8 million bags.			
EFP's	Allowed, and more important in size than physical deliveries.			
Relative size of deliveries	Physical deliveries in 1990 were equal to 2 1/2 months of United States coffee consumption.			
Market participants	About half of turnover is from non-commercial interests. Institutional investors are not too important: they retain generally 5-20 per cent of open interest. Use is still mainly by developed country companies, especially traders (partly as a reflection of the use of executable orders), but there is a growing direct participation of developing country exporters.			
Use as price reference	This is the main contract for internationally traded arabica coffee, and gives the reference price for a large part of world arabica coffee transactions.			

Other arabica coffee contracts:

- **Arabica coffee contract, 6MT, Bolsa de Mercadorias y Futuros (Brazil)**
  Launched in August (futures) and September 1991 (options). Turnover in 1991: 10,862 futures and 734 options contracts; in 1993 87,753 futures and 1,504,776 option contracts. In 1993, 268,159 contracts were exercised, which implies a physical volume of 1.6 million tonnes (more than double Brazil's arabica production) was transacted through the exchange. Although denominated in US$, the contract is mainly used by domestic interests.

ROBUSTA COFFEE

London Commodity Exchange				
Contract specifications	Robusta coffee, 5 MT Approximate value of one contract, January 1994: US$ 1,522			
Contract periods traded	Contracts are traded until 16 months forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	1,163,449	908,963	42,771	282,263
Relative size of turnover	In 1993, futures and options turnover was equal to approximately 5 times world robusta exports.			
Standard delivery procedures	Delivery is CIF, in different ports in Europe and in New Orleans.			
Delivered quantities	In the first ten months of 1992, 61,100 MT of robusta were tendered against the London Fox robusta contract.			
EFPs	In the first ten months of 1992, against actuals for 187,025 MT of robusta coffee were closed.			
Relative size of deliveries	Physical deliveries in 1992 equaled about 5 per cent of world robusta exports, while EFPs equaled about one sixth of world exports.			
Market participants	Market participants include brokerage houses, banks and traders; producers and consumers of robusta coffee use the market through these intermediaries. The role of non-commercial participants is relatively limited.			
Use as price reference	The London Fox robusta price is the main reference price for world robusta trade.			

Other robusta coffee contracts

Robusta coffee is also traded in pesos on the Manila International Futures Exchange. Volume in 1993: 143,788 contracts.

COPPER

London Metal Exchange				
Contract specifications	Grade A - Electrolytic copper, 25 MT Approximate value of one contract, January 1994: US$ 30,210			
Contract periods traded	The contract can be traded until 27 months forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	5,668,847	14,955,430	325,118	1,156,352
Relative size of turnover	In 1991, futures and options turnover was equal to approximately 93 times world refined copper exports, or 33 times world refined copper consumption.			
Standard delivery procedures	Delivery against this contract is possible CIF in a number of European warehouses.			
Delivered quantities	In 1991, 428,425 MT of copper was delivered into LME warehouses, 279,650 MT was delivered out of LME warehouses.			
EFPs	Not allowed under exchange regulations.			
Relative size of deliveries	Deliveries into LME warehouses equaled about one sixth of European copper imports, while deliveries out of LME warehouses equaled about one month of European refined copper consumption.			
Market participants	The participation of investment funds is small; producers, trade houses and copper consuming companies predominate, in futures as well as in options.			
Use as price reference	This is the most used copper contract worldwide . It acts as a reference price for 70 per cent of international copper trade.			

Commodity Exchange (New York)				
Contract specifications	Grade 1 Electrolytic copper, 25,000 pounds Approximate value of one contract, January 1994: US$ 30,210			
Contract periods traded	Futures contracts are traded until 23 months forward, options contracts until one year forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	1,853,185	2,064,629	107,387	146,060
Relative size of turnover	In 1993, futures and options turnover was equal to approximately 12 times United States copper consumption.			
Standard delivery procedures	Delivery against this contract is CIF in a number of United States warehouses. In 1992, the exchange introduced a market for the trade of copper warrants, the delivery certificates for copper, to permit buyers to control when and where they take delivery of copper.			
Delivered quantities	Deliveries into COMEX warehouses during the first eleven months of 1992 were about 59,700 short tonnes, deliveries out of COMEX warehouses amounted to 19,600 MT.			
EFPs	In 1991, 15,104 EFPs for copper, amounting to 189,250 short tonnes, took place.			
Relative size of deliveries	Deliveries into of COMEX warehouses were equal to somewhat over a week of United States consumption, while EFPs equaled only 8 per cent of United States consumption.			
Market participants	Participants are mainly United States companies. Active arbitrage takes place with the LME copper contract. Non-commercial interests are relatively important in turnover, compared to the LME.			
Use as price reference	This contract is mainly of relevance for copper trade within the United States, although it is also used as a price reference for part of United States imports.			

COTTON

New York Cotton Exchange				
Contract specifications	Cotton, 50,000 pounds Approximate value of one contract, January 1994: US$ 30,000.			
Contract periods traded	Futures are traded until 18 months forward, options until 12 months.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1991
	1,543,611	1,903,027	284,991	372,074
Relative size of turnover	In 1993 futures and options turnover was equal to approximately 8 times world exports.			
Standard delivery procedures	Delivery against the contract is possible in a number of United States warehouses. United States import procedures do not allow the delivery of foreign cotton.			
Delivered quantities	In 1991, 3,398 contracts resulted in delivery.			
EFPs	Not allowed under exchange regulations.			
Relative size of deliveries	Physical deliveries are less than 0.1 per cent of United States cotton consumption.			
Market participants	Non-commercial interests account for about 40 per cent of the turnover. Use is mainly by United States companies.			
Use as price reference	Although this contract has been used for hedging world market transactions in cotton or as reference price (including by Latin American countries and countries such as Egypt and Sudan) in recent years price developments tend more to reflect domestic United States conditions than world market conditions.			

Other cotton contracts

- **Japanese exchanges**
  Exchanges in Nagoya, Osaka and Tokyo trade cotton yarn, in units of 4,000lb. These provide the price references for part of Japan's cotton yarn imports.

CRUDE OIL

New York Mercantile Exchange				
Contract specifications	Crude oil, 1,000 barrels Approximate value of one contract, January 1994: US$ 13,500.			
Contract periods traded	Futures contracts are traded until 36 months forward, options until 12 months.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	23,686,897	24,868,603	5,254,612	7,156,518
Relative size of turnover	In 1993, futures and options turnover was equal to approximately 3 times world trade, or 1.2 times world production.			
Standard delivery procedures	Delivery against the contract is FOB Cushing, Oklahoma, but buyers and sellers who have been matched by the Exchange subsequent to the termination of the trading in the spot month contract can agree to delivery under terms different from the ones prescribed in the contract specifications.			
Delivered quantities, 1991	In 1991, only 4,552 contracts resulted in delivery.			
EFPs	In 1991, 669,018 contracts were used for an Exchange of Futures against Physicals.			
Relative size of deliveries	EFPs were equal to approximately 7 per cent of world trade in crude oil.			
Market participants	Most transactions are by European, United States and Japanese companies, but since the late 1980s a number of developing country companies have become active.			
Use as price reference	Together with the Brent crude oil contract of the International Petroleum Exchange, this contract provides the benchmark price at which a large part of world crude oil trade is executed, and is also much used for hedging. The newly introduced sour crude contract may take over part of this role as it conforms closer to the type of crude oil that now prevails in international trade.			

International Petroleum Exchange (London)				
Contract specifications	Brent crude oil, 1,000 barrels Approximate value of one contract, January 1994: US$ 13,500.			
Contract periods traded	Futures contracts are traded up to 18 months forward, options up to 12 months.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	4,083,092	8,852,549	188,934	1,059,222
Relative size of turnover	In 1993, futures and options turnover was equal to world trade, or eight times Brent crude oil production.			
Standard delivery procedures	No physical delivery, but cash settlement.			
Market participants	The role of non-commercial interests is limited, although the 'Wall Street refiners' (banks such as Morgan Stanley or Goldman Sachs) are still fairly active. There is a large international use, primarily by the large oil companies, but also by oil users, and by a number of developing country oil exporters (including some OPEC members) and importers (among others, Brazil and India).			
Use as price reference	Together with the crude oil contract of the New York Mercantile Exchange, this contract provides the benchmark price at which a large part of world crude oil trade is executed.			

GOLD

Commodity Exchange NYMEX (New York)				
Contract specifications	Gold, 100 troy ounces Approximate value of one contract, January 1994: US$ 36,000.			
Contract periods traded	Futures can be traded until 60 months forward, options until one year forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	9,730,041	8,916,195	1,931,804	1,717,015
Relative size of turnover	This is, in volume of gold traded, the world's largest gold futures contract.			
Standard delivery procedures	Physical delivery is into a COMEX warehouse in New York.			
Delivered quantities	During the first 11 months of 1992, over 2 million troy ounces of gold were delivered into and out of COMEX warehouses.			
EFPs	During 1991, 546,378 EFPs took place, amounting to 5.5 million troy ounces of gold.			
Relative size of deliveries	Physical deliveries of gold were equal to over one quarter of United States gold production; EFPs equaled about one tenth of world production.			
Market participants	Investment participation in the trade in this contract prevails, although hedgers (such as mining companies and jewelry manufacturers) also use it. COMEX also trades a 5-day gold options contract, which is mainly used for investment purposes.			
Use as price reference	Used as reference price, together with the London bullion price.			

Bolsa de Mercadorias & Futuros (Sao Paolo)			
Contract specifications	Gold in bars, 250 grams; denominated in cruzeiros. Approximate value of one contract, January 1993: US$ 9,672. Denominated in cruzeiros.		
Contract periods traded	Only options on actuals are traded, until 12 months forward.		
Transaction volume	**Futures contracts**	**Option contracts**	
	None	1991	1993
		7,452,730	9,406,163
Standard delivery procedures	The contract can be cash-settled, or settled by physical delivery to an exchange warehouse.		
Delivered quantities	A considerable part of the contracts, around 760,000 put and call options in 1991, are used to make or take physical delivery.		
EFPs	Not allowed under contract specifications.		
Market participants	Investment participation in the trade in this contract prevails - this gold contract is much used as a hedge against inflation.		

Other gold contracts

- **Gold, 1 kg, Tokyo Commodity Exchange**
  Transaction volume in 1990: 6,873,304 futures contracts (options are not traded).
  Transaction volume in 1993: 8,764,441 futures contracts.
  The contract is denominated in yen, and mainly used by domestic speculative interests.

Gold contracts are also traded at the Singapore International Monetary Exchange, the Chicago Board of Trade and the MidAmerica Commodity Exchange.

LEAD

London Metal Exchange				
Contract specifications	Refined pig lead, 25 MT Approximate value of one contract, January 1993: US$ 8,212.			
Contract periods traded	The contract can be traded until 15 months forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	610,351	1,020,579	1,405	17,299
Relative size of turnover	In 1993, futures and options turnover was equal to over 17 times world trade, or approximately 4 times world consumption.			
Standard delivery procedures	Delivery against this contract is CIF in a number of European warehouses.			
Delivered quantities	In 1991, physical deliveries into LME warehouses equaled 56,635 MT, while deliveries out of LME warehouses equaled 44,825 MT.			
EFPs	Not allowed under exchange regulations.			
Relative size of deliveries	In 1991, deliveries into LME warehouses equaled about one month of European production.			
Market participants	The participation of investment funds is small; producers, trade houses and lead consuming companies predominate, in futures as well as in options.			
Use as price reference	This is the only lead contract of international relevance, and is much used as a reference price for international trade in lead.			

NICKEL

London Metal Exchange				
Contract specifications	Primary nickel, 6 MT Approximate value of one contract, January 1993: US$ 139,450			
Contract periods traded	Contracts are traded until 15 months forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	572,970	2,118,710	9,240	70,607
Relative size of turnover	In 1993, futures and options turnover was equal to over 20 times world trade, or approximately 15 times world consumption.			
Standard delivery procedures	Delivery against this contract is CIF in a number of European warehouses.			
Delivered quantities	In 1991, deliveries into LME warehouses equaled 71,538 MT, deliveries out of LME warehouses 63,690 MT.			
EFPs	Not allowed under exchange regulations.			
Relative size of deliveries	1991 deliveries into LME warehouses equaled approximately one quarter of European nickel consumption.			
Market participants	The participation of investment funds is small; producers, trade houses and nickel consuming companies predominate, in futures as well as in options.			
Use as price reference	This is the only nickel contract of international relevance, and much used as a reference price for international trade in nickel.			

ORANGE JUICE

New York Cotton Exchange				
Contract specifications	Frozen Concentrated Orange Juice, 15,000 lbs solids Approximate value of one contract, August 1991: US$ 18,750			
Contract periods traded	Futures contracts are traded until 18 months forward, options contracts until 12 months.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	342,574	640,131	287,538	101,214
Standard delivery procedures	Deliverable CIF at warehouses in Florida, Delaware, New Jersey and California.			
Delivered quantities, 1991	Deliveries against the contract: 2,727 in 1991.			
EFPs	Not allowed under exchange regulations.			
Market participants	Non-commercial interests account for about 30-40 per cent of the market. For the rest, this contract is mainly used by United States producers and importers, and Brazilian exporters.			
Use as price reference	The contract is used as a price reference for United States domestic and international trade.			

PALM OIL

Kuala Lumpur Commodity Exchange			
Contract specifications	Crude palm oil, 25 MT Approximate value of one contract, January 1994: US$ 10,100 Contract is denominated in Malaysian Ringgit.		
Contract periods traded	Traded up to 12 months forward, but most trade is in the nearest 3-4 months.		
Transaction volume	**Futures contracts**		**Option contracts**
	1990	1993	No option contracts are traded.
	242,023	355,743	
Relative size of turnover	Contract turnover in 1993 was more or less equal to world trade.		
Standard delivery procedures	Delivery is FOB in one of three Malaysian ports.		
Delivered quantities, 1991	In 1991, 139,550 MT of crude palm oil was tendered, 1.7 per cent of the total contract turnover.		
EFPs	Allowed, but volume is minimal.		
Relative size of deliveries	Physical delivery in 1991 was equal to somewhat over 1 week of Malaysia's exports.		
Market participants	One quarter of turnover is from floor traders, who are mainly intra-day speculators. Most of the remaining three quarters of turnover is from trade interests, including United States, European and Japanese trade houses.		
Use as price reference	The contract is used as a price reference for a large part of international trade in palm oil.		

RUBBER

Singapore Commodity Exchange	
Contract specifications	Three types of rubber futures contracts are traded: - Ribbed Smoked Sheet (RSS) International 1 and International 3: contract size is 5 MT for single month contracts, 15 MT for quarterly contracts. - Technically Specified Rubber 20 (TSR 20): contract size is 20 MT for single month contracts, 60 MT for quarterly contracts.
Contract periods traded	Contracts can be traded up to 18 months forward.
Transaction volume	Organized trade only started in 1992. Total volume October 1992 to September 1993 was over one million MT of rubber, equivalent to over one quarter of world trade.
Standard delivery procedures	Delivery is different for the three types of rubber: - TSR 20: warehouse delivery in Singapore - RSS 3: idem, or to be loaded on a vessel in the port of Singapore - RSS 1: idem, with the ports of Port Klang and Penang (Malaysia) and one Thai port added
Market participants	Brokers, traders, and tyre factories are member of the exchange, including a number of Japanese companies. Arbitrage with the Kobe rubber contract is fairly active.
Use as price reference	Contract prices are used as a reference price for international rubber trade.

Other rubber futures contracts:

- **Kobe Rubber Exchange** and **Tokyo Commodity Exchange**
  Trade RSS 3, in 5 MT contracts. Contracts are spot, and for the next three and following two even months. Caters mainly to domestic Japanese interests, although arbitrage with the Singapore exchange takes place.

SILVER

Commodity Exchange - New York Mercantile Exchange				
Contract specifications	Refined silver, 5,000 troy ounces Approximate value of one contract, January 1994: US$ 12,828			
Contract periods traded	Futures contracts are traded until 23 months forward, options until one year forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	3,913,609	4,855,924	747,499	1,094,702
Relative size of turnover	In 1993, futures and options turnover was equivalent to approximately 70 times world production (CIS and China excluded).			
Standard delivery procedures	Physical delivery is possible.			
Delivered quantities	In the first eleven months of 1991, more than 75 million troy ounces of silver were delivered into COMEX warehouses, while over 65 million troy ounces were delivered out of LME warehouses.			
EFPs	In 1991, 205,698 EFPs for silver, equaling over one billion troy ounces, took place.			
Relative size of deliveries	Deliveries into COMEX warehouses equaled over half of United States silver production. EFPs for silver equaled almost three times world production (CIS and China excluded).			
Market participants	Participants include non-commercial interests and silver producers (North American mines and a few Latin-American producers, including from Peru; the Mexican Central Bank, with the monopoly on silver exports, is member of COMEX).			
Use as price reference	This contract is used for reference prices.			

Silver contracts are also traded at the MidAmerica Commodity Exchange, the Toronto Exchange, and the Tokyo Commodity Exchange.

SOYABEANS AND SOYABEAN PRODUCTS

Chicago Board of Trade				
Contract specifications	Soyabeans, 5,000 bushels Approximate value of one contract, January 1994: US$ 33,000.			
Contract periods traded	Contracts are available up to one year forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	10,301,905	11,649,333	2,089,382	2,927,072
Relative size of turnover	In 1991, futures and options turnover was equivalent to approximately 16 times world production, or 31 times United States production.			
Standard delivery procedures	Delivery is possible in a number of United States towns: Chicago, Toledo (Ohio) and St. Louis.			
Use as price reference	The CBOT contract for soyabeans provides the benchmark price for a large part of world market transactions in this commodity.			

Chicago Board of Trade				
Contract specifications	Soyabean oil, 60,000 lbs Approximate value of one contract, January 1993: US$ 15,050			
Contract periods traded	The contract is traded up to one year forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	4,658,302	4,612,229	138,089	181,938
Relative size of turnover	In 1993, futures and options turnover was equivalent to approximately 7 times world production.			
Standard delivery procedures	Delivery is possible in a number of tanks in the United States Mid-West.			
Use as price reference	The CBOT contract for soyabean oil provides the benchmark price for a large part of world market transactions in this commodity; as it is the most liquid contract traded for a vegetable oil, it is also used as a reference price, and for hedging purposes, for other vegetable oils.			

Chicago Board of Trade				
Contract specifications	Soyabean meal, 100 MT Approximate value of one contract, March 1992: US$ 21,000.			
Contract periods traded	The contract is traded up to one year forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	4,904,471	4,718,095	181,429	306,523
Relative size of turnover	In 1993, futures and options turnover was approximately 7 times world production, or 15 times world trade.			
Standard delivery procedures	Delivery is possible through shipping certificates for a number of United States ports.			
Use as price reference	The CBOT soyabean meal contract provides the benchmark price for a large part of world market oil meal transactions.			

Contracts in soyabeans are also traded in Manila, a number of Japanese exchanges, and the MidAmerica Commodity Exchange. Soyabean meal futures and options contracts are traded on London Fox, futures on the MidAmerica Commodity Exchange.

SUGAR
RAW SUGAR

Coffee, Sugar & Cocoa Exchange (New York)				
Contract specifications	World sugar No.11, 112,000 lbs Approximate value of one contract, January 1993: US$ 9,000.			
Contract periods traded	The futures and options contracts are traded 18 months forward. Both contracts are very liquid a year forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	5,424,801	4,285,945	2,393,016	916,170
Relative size of turnover	Futures and options turnover in 1993 was equivalent to approximately 40 times free world market trade (that is, trade outside of the main preferential schemes).			
Standard delivery procedures	This is a FOB contract, with delivery against the contract possible from the main ports of most large sugar producing countries, with the exception of Cuba.			
Delivered quantities	In 1990, 11,461 contracts were closed out by delivery.			
EFPs	Allowed, and more important in size than physical deliveries.			
Relative size of deliveries	In 1990, physical deliveries accounted for approximately 8 per cent of the trade in the free market for sugar.			
Market participants	Participation by investment funds and other speculative actors is very high, accounting for a major part of turnover. The other main participants are trade houses, which reflects the widespread use of executable orders in sugar trade. Very strong international participation.			
Use as price reference	This is the principal contract for raw sugar traded other than under special arrangements. It is used as the reference price for a large part of such sugar transactions.			

Coffee, Sugar & Cocoa Exchange (New York)			
Contract specifications	No. 14 sugar, 112,000 lbs Approximate value of one contract, March 1992: US$ 24,000.		
Contract periods traded	Contracts can be traded up to 18 months forward.		
Transaction volume	**Futures contracts**		**Option contracts**
	1990	1993	No option contracts are traded.
	139,143	133,898	
Relative size of turnover	Turnover in 1991 was approximately equal to United States consumption.		
Standard delivery procedures	Delivery in a number of United States ports, cane sugar in bulk, CIF duty paid.		
Delivered quantities	In 1990, 5,385 deliveries took place against the No. 14 contract.		
EFPs	Allowed, and more important in size than physical deliveries.		
Relative size of deliveries	1990-deliveries were equivalent to approximately 2 weeks of United States consumption.		
Market participants	This is a contract reflecting domestic United States sugar prices, and therefore mainly of relevance to United States producers and consumers and to those importing sugar under the United States preferential tariff programme; participation by investment funds is limited.		
Use as price reference	Some exporters with a United States quota use the No. 14 futures price as the reference price in their contracts.		

London Commodity Exchange				
Contract specifications	No. 7 premium raw sugar, 50 MT (112,000 pounds) Approximate value of one contract, January 1993: US$ 9,000.			
Contract periods traded	Both futures and options are quoted one year forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	892,866	329,414	30,256	Not traded
Relative size of turnover	Futures and options volume for this contract's predecessor, the No. 6 contracts, was, in 1990, equivalent to approximately 6 times free world market trade. Since, contract volume has declined precipitously (e.g., in 1992, only 75,052 contracts traded). With the launch of the No.7 contract, volume has picked up again.			
Standard delivery procedures	This is a FOB contract, with delivery against the contract possible from the main ports of most large sugar producing countries, with the exception of Cuba.			
Delivered quantities	1,093 contracts resulted in delivery in 1992, equal to only 4 cargoes.			
EFPs	In the period January-November 1992, 7,027 against actuals transactions took place, equivalent to over 350,000 MT; this amounts to around 2 per cent of world raw sugar trade.			
Market participants	Large participation of international trade houses.			
Use as price reference	Turnover in this contract was declining until 1993, and its relevance (be it for hedging or as a price reference) for international sugar trade has become rather small.			

Other raw sugar contracts

- **Japanese exchanges**
  Raw sugar futures and options contracts, in units of 10 MT, are traded at exchanges in Osaka and Tokyo. Transaction volumes can be high (in 1993, 2,257,138 raw sugar contracts were traded in Tokyo, representing close to eight times Japanese consumption, and 1,090,273 raw sugar contracts in Osaka), but non-commercial interests account for a major part of futures trade. Volume can change very strongly from one year to another. The prices formed on the Japanese exchanges are mainly of relevance for the internal market. Japanese sugar imports in general do not have Japanese exchange prices as reference price, but the New York or London prices.

- **Manila International Futures Exchange**
  A raw sugar contract is traded, denominated in pesos (pesos are fully convertible; peso-US$ dollar contracts are also traded on the Exchange). Volume in 1993: 315,212 futures contracts.

WHITE SUGAR

London Commodity Exchange				
Contract specifications	White sugar, 50 MT Approximate value of one contract, March 1992: US$ 12,000			
Contract periods traded	Contracts are traded until 16 months forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	347,333	329,414	7,283	None
Relative size of turnover	Futures and options volume in 1993 was equivalent to approximately 1.5 times free world market trade in white sugar.			
Standard delivery procedures	Delivery is FOB, from designated ports in the main sugar producing countries.			
Delivered quantities	In 1992, 2,553 contracts resulted in delivery, equal to somewhat over 1 per cent of free world market trade in white sugar.			
EFPs	In the period July 1992 (when these transactions became possible to November 1992, 3,559 Against Actuals took place, equivalent to close to 2 per cent of free world market trade in white sugar.			
Market participants	A few European trade houses account for the major part of turnover.			
Use as price reference	Although transaction volume on this contract has declined (and liquidity is in general not high enough to hedge large quantities of sugar without negatively affecting prices), it is still used as a reference price by exporters.			

MATIF (PARIS)			
Contract specifications	White sugar, 50 MT Approximate value of one contract, March 1992: US$ 12,000		
Contract periods traded	Contracts are traded until 16 months forward.		
Transaction volume	**Futures contracts**		**Option contracts**
	1990	1993	Option contracts are not traded.
	302,908	262,940	
Relative size of turnover	Turnover in 1993 was slightly higher than world free market trade in white sugar.		
Standard delivery procedures	This is a FOB contract, deliverable from a number of producing country ports.		
Delivered quantities	No deliveries took place in 1990 or 1991.		
Market participants	No investment fund is member of the MATIF sugar market. The market is dominated by a small number of European trade houses.		
Use as price reference	Although transaction volume on this contract has declined, it is sometimes used as a contract reference price in international trade.		

Other white sugar contracts

- **Japanese exchanges**
  White sugar futures, in units of 9 MT, are traded at exchanges in Kanmon, Nagoya, Osaka and Tokyo.

TIN

London Metal Exchange				
Contract specifications	Refined tin, 5 MT Approximate value of one contract, January 1993: US$ 29,500.			
Contract periods traded	Contracts are traded until 15 months forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	361,196	613,952	(introduced in June 1991)	10,638
Relative size of turnover	Turnover in 1993 was equivalent to close to fifteen times world consumption of tin, or 20 times world tin trade.			
Standard delivery procedures	Delivery against this contract is CIF in a number of European warehouses.			
Delivered quantities	In 1991, 18,795 MT of tin were delivered into LME warehouses, 25,855 MT were delivered out of LME warehouses.			
EFPs	Not allowed under exchange regulations.			
Relative size of deliveries	Deliveries into LME warehouses were equal to about one third of European tin metal imports, deliveries out of LME warehouses were equal to almost half of European primary tin metal consumption.			
Market participants	The participation of non-commercial interests is small; trade houses and tin consuming companies predominate, in futures as well as in options.			
Use as price reference	This is the main international tin contract. It is used as a reference price for international trade in tin.			

WHEAT

Chicago Board of Trade				
Contract specifications	Wheat, 5,000 bushels Approximate value of one contract, January 1993: US$ 23,000			
Contract periods traded	The contract is traded up to two years forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	2,876,270	3,019,629	482,941	713,670
Relative size of turnover	In 1991, futures and options turnover was equivalent to approximately 10 times world production.			
Standard delivery procedures	Delivery is possible in a number of United States towns: Chicago, Toledo (Ohio) and St. Louis.			
EFPs	Allowed.			
Market participants	This contract is used for hedging by exporters (including Argentina) and importers (including China).			
Use as price reference	This contract provides the reference price for a major part of international wheat trade.			

Wheat contracts are also traded at the Mid America Commodity Exchange, the Kansas City Board of Trade, the Minneapolis Exchange, the Winnipeg Exchange, and a number of exchanges in China and countries in transition.

ZINC

London Metal Exchange				
Contract specifications	Special High Grade Zinc, 25 MT Approximate value of one contract, January 1993: US$ 24,927.			
Contract periods traded	Contracts are traded until 27 months forward.			
Transaction volume	**Futures contracts**		**Option contracts**	
	1990	1993	1990	1993
	1,417,384	4,167,832	30,723	163,475
Relative size of turnover	In 1993, futures and options turnover was equivalent to approximately twenty times world production.			
Standard delivery procedures	Delivery against this contract is CIF in a number of European warehouses.			
Delivered quantities	In 1991, 183,975 MT of zinc were delivered into LME warehouses, 86,500 MT were delivered out of LME warehouses.			
EFPs	Not allowed under exchange regulations.			
Relative size of deliveries	Deliveries into LME warehouses in 1991 were equivalent to somewhat over one week of world production.			
Market participants	The participation of investment funds is small; producers, trade houses and zinc consuming companies predominate, in futures as well as in options. Producers have become increasingly important in recent years, accounting sometimes for up to 40 per cent of options turnover.			
Use as price reference	This is the only zinc contract of international relevance. It is used as a reference price for international trade in zinc.			